

# HITCHCOCK'S *Machine Tool* BLUE BOOK

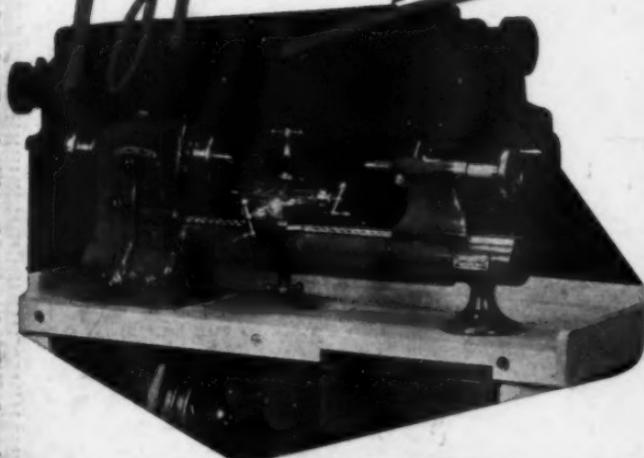
FOUNDED

AUGUST 1938

1905

## HARDINGE BENCH LATHES

### *in Typewriter Plants*



#### HARDINGE PRECISION PRELOADED BALL BEARING BENCH LATHE UNITS

are in daily use at  
the plants of the well-known typewriter manufacturers.

They are used in the laboratory, development, model, tool-room and production departments because of extreme accuracy and carefree high spindle speeds.

Be sure you have a Hardinge proposal when considering Bench Lathe equipment.

Send Quickmail Coupon No. 1 for bulletin which gives complete information.

*Lataract*

# HARDINGE

*Lataract*

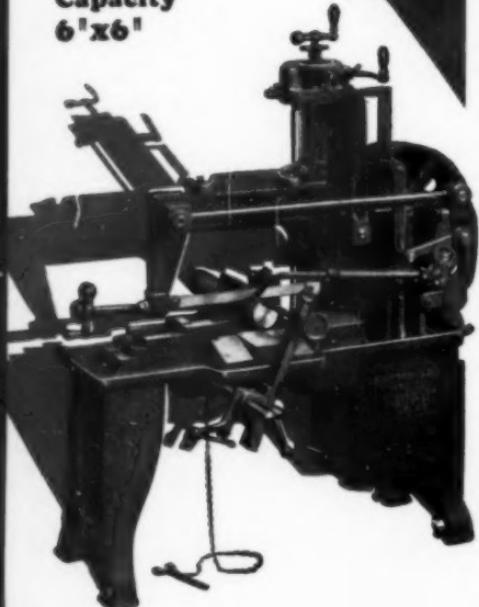


# MARVEL

Saws  
SP 330 at a LOW PRICE



No. 4B  
Capacity  
6"x6"



Send  
Quickmail Coupon No. 5  
for  
Catalog

Outcuts all hack saws and band saws in its price class.

If you are looking for a really fast-cutting saw at a moderate price, for your general run-of-the-shop cutting - off work, the MARVEL No. 4B High Speed Hack Saw is the machine you want.

No other general-purpose saw offers all these features: Quick return of saw blade on non-cutting stroke (like a shaper ram); high speed (will run smoothly at 150 strokes per minute); saw blade always horizontal (not "tilting" type); dependable friction screw-feed (also convenient hand screw feed); quick action vise; reliable plunger-type coolant pump, direct connected without belts or gears; adjustable height-and-depth stop-cams; automatic stop that also stops the motor; simple, indestructible, clamping type blade holders; convenient end-gauge; can be set to run saw blade up and down continuously for quick chucking operations; most economical to operate; and now equipped with anti-friction ball bearings in saw frame slide that assures a rigid saw frame without wear, without friction.

Available in belt drive, single speed or 4-speed; motor drive single speed, 2-speed or 4-speed; with either open-leg base as illustrated, or with full cabinet base.

Armstrong, Blum & Co.

7141 Bloomingdale Ave., Chicago



## THE FEATURES YOU WANT IN A CHUCK!

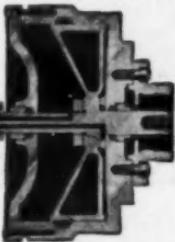
### **Model B Heavy Duty 3-Jaw Chuck**

One-piece electric steel body. Heavy duty single groove jaw slot. Retains accurate fit indefinitely. Dustproof draw sleeve, oversize one-piece forged operating levers.



### **Rotating Air Cylinder for Chuck Operation**

Hannifin "Leak-proof" construction, with graphite treated piston packing adjustable without special tools or removal of any parts. Special piston shape reduces air consumption to the minimum. Air connection packings adjustable without stopping the machine. Built in various sizes, power range 390 lbs. to 20,000 lbs.



- Naturally you want fast smooth action, accuracy, minimum air consumption. Then simple and substantial construction plus easy adjustment to assure long life with minimum attention.

Investigate Hannifin Air Operated Chuck design with these features in mind. Bodies are one-piece cast steel. The jaw slots have heavy-duty single grooves to retain accurate fit indefinitely. One-piece forged operating levers are oversize for positive and dependable operation. Draw sleeves are dust proof, protecting the working parts. Hannifin rotating air cylinders for chuck operation have the exclusive "Leakproof" construction with easily adjustable piston packing, special piston shape, and simplest air connection adjustments.

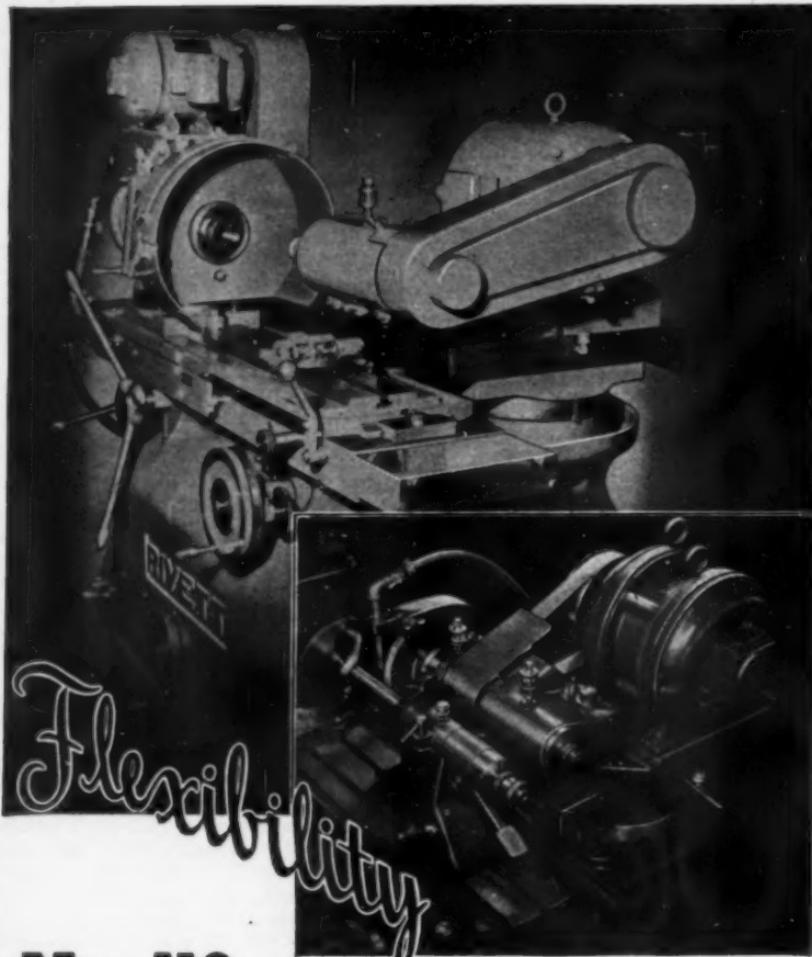
Many leading manufacturers have standardized on Hannifin equipment for production chucking operations. All machine tool builders can furnish Hannifin equipment on new machines. Write for Chuck Bulletin 37-H, use Quickmail Coupon No. 47.

**HANNIFIN MANUFACTURING COMPANY**  
621-631 South Kolmar Avenue, Chicago, Illinois

*Engineers • Designers • Manufacturers • Pneumatic and Hydraulic Production Tool Equipment*

# HANNIFIN

AIR OPERATED CHUCKS



## No. 112 UNIVERSAL GRINDER

Primarily is for medium and large internal and external tool-room grinding, straight, bevel, two angle or straight and bevel at one setting.

Send for Bulletin 112-B.

**RIVETT** LATHE & GRINDER INC.  
BRIGHTON BOSTON MASS.

For further information, use Quickmail Coupon No. 45.



● Model ML—newest Do-All Machine—does faster, smoother, more accurate work—both internal and external—on 48 different substances (up to 10<sup>8</sup> thick) from hardest high carbon steel to soft brass, copper, etc.

Only machine in the world with this wide speed range—50 to 1500 feet per minute. Does jobs in one hour which formerly required a whole day.

### Actually, 3 Machines in 1

Convert in less than a minute from Band Sawer to Filer or Polisher.

Work table 24<sup>8</sup> square, tilts four ways. Throat 16<sup>8</sup> deep. Weighs 1300 pounds. Requires 33x25<sup>8</sup> floor space.

Equipped with exclusive JOB SELECTOR—tells instantly speed and kind of accessory to use on every material; latest SPEED GAUGE; automatic BUTT WELDER; MOTORS; 20 BAND SAWS; 4 FILE BANDS; 3 POLISHING BANDS, etc.

The Do-All has been adopted by leading industries because it pays for itself in four months on an 8-hour production schedule.

*Let us prove its worth. A factory-trained man will bring a Do-All to your plant and show you exactly what it does, what it saves, on your own work.*

#### CONTINENTAL BAND FILER

A new, efficient, bench model for rapid internal and external band filing. 32<sup>8</sup> high. Weighs 150 lbs. Only \$88 without motor.

See at your dealer's or order on 10 days trial. Circular free.



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- Send data and special price on Model ML.
- Continental Band Filer.
- Send Free Hand Book.

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Address .....

City ..... State .....

H8

# COLLETS-FEED FINGERS-PADS FOR YOUR AUTOMATIC and HAND SCREW MACHINES



*Send Quickmail Coupon No. 3 for this catalog 34  
if you have  
AUTOMATIC and HAND SCREW MACHINES*

**MORRISON COLLETS, FEED FINGERS, MASTER COLLETS, MASTER FEED FINGERS AND PADS:** for Brown & Sharpe, Cleveland, Cone, Gridley, National Acme, New Britain, Davenport, etc., Automatics.

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—STANDARD SIZES FROM STOCK—

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**Elmira, N. Y.**

# DRAW-IN COLLETS

FOR YOUR  
LATHES AND MILLERS

**HARDINGE**  
COLLETS SINCE 1890

DRAW-IN COLLETS  
FOR ALL  
LATHES AND MILLERS

PROMPT DELIVERY FROM STOCK

FOR  
—ACCURACY—  
—DURABILITY—  
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"SPECIFY HARDINGE COLLETS"

Refer To Inside Pages For Your Requirements  
Purchasing and Engineering Departments - Keep The List for Reference Purposes

Hardinge Collets are in stock for immediate delivery. Hardinge Collets embody those elements of precision which have characterized our products since 1890.

**HARDINGE BROTHERS, INC., ELMIRA, NEW YORK**

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if you have  
LATHES and MILLERS*

**HARDINGE COLLETS:** for American, Ames, Boye & Emmes, Carroll & Jamieson, Chard, Cincinnati, Cisco, Dalton, Flather, Greaves-Klusman, Hamilton, Hendey, LeBlond, Monarch, Porter-Cable, Pratt & Whitney, Rahn Larmon, Reed-Prentice, Rivett, Rockford, Sebastian, Seneca, Sidney, South Bend, Springfield, Stark, Sundstrand and our own Hardinge Cataract Lathes.

**HARDINGE COLLETS:** for Ames, Becker, Burke, Pratt & Whitney, Reed-Prentice, Rockford, Stark, Sundstrand, Van Norman and our own Hardinge Cataract Millers.

Bulletin No. 37 gives complete information; dimensions of standard collets; lists attractive prices; makes ordering easy. Gives location of collet stocks in six important centers in the United States.

**SPECIFY HARDINGE COLLETS—**

**HARDINGE BROTHERS, Inc.,**

**Elmira, N. Y.**

# DRILL 75% FASTER

*Drills Stay Sharp  
Longer!*

in concrete, tile,  
brick, slate, plaster,  
limestone, marble,  
glass, carbon,  
asbestos,  
etc.

(Patented)

WITH  
**WILLEY'S**  
CARBIDE  
TIPPED  
DRILLS



SPECIFICATIONS AND PRICES

No.	Drill Diameter	Price Each	SHANK SIZE	Length	Overall Length
			A	B	C
R-1	1/8	\$3.50	5/64	5/8	2 1/4
R-2	1/4	4.00	3/16	3/8	3 3/8
R-3	5/16	4.50	1/4	3/8	3 3/8
R-4	3/8	5.00	1/4	1	4
R-5	1/2	5.50	3/8	1 1/4	6
R-6	5/8	6.50	3/8	1 1/4	6
R-7	3/4	8.00	3/8	1 1/4	6
R-8	7/8	9.50	7/16	1 1/4	6
R-9	1	12.00	7/16	1 1/4	6
R-10	1 1/4	15.00	7/16	1 1/2	6
R-11	1 1/2	18.00	1/2	1 1/2	6
R-12	2	23.00	5/8	2	6

Here at last, is a drill that is especially designed for drilling any and all kinds of non-metallic materials . . . a drill with a special patented Carbide Tip that gives far greater cutting power . . . a Drill that actually gives 75% greater drilling speed and without the use of any outside cooling agent either . . . a Drill that's built to stand up under the hardest possible working conditions . . . a Drill that will outlast a dozen of the ordinary old type star drills . . . a Drill that can be used in any portable drill, hand brace or drill press at any r. p. m. Can be sharpened on any type of standard grinder with any make of grinding wheel.

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1344 W. Vernor Highway,

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**COSTS GO DOWN!**

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welds

## with SKILSAW DISC SANDERS

Try them on your toughest weld grinding or cleaning work . . . and you'll find that SKILSAW Disc Sanders will not only save you considerable time and labor, but will do the job better and easier! Use SKILSAW Disc Sander with cup grinding wheels (up to 6 in. diam.) and watch the spot and raised welds just melt away before its rush of grinding power that leaves the surface as smooth and clean as you want it. Made in 3 models, for use with grinding wheels, wire brushes, polishing pads, etc. on flat, concave and convex surfaces of metal, wood, stone, marble, tile and composition.

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• a size to fit  
every job!

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## Cut PRODUCTION COSTS WITH EX-CELL-O Broaches

Broaching, the fastest known means of removing metal to close limits, offers you unusual opportunities for increasing production, reducing unit cost, holding closer tolerances, and improving finish.

Holes that are round, rectangular or odd shaped, with keyways or splines — surfaces that are flat, curved, slotted — in fact, any contour which is continued in a straight line, can be broached. Materials? — Almost any machinable material can be broached.

You may have several parts you've been thinking of broaching, but have wondered what it would cost. We suggest you send us blue prints of the parts; we'll send you a quotation on broaches, without obligation.

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GET EVERYTHING  
ANYBODY COULD  
ASK FOR IN THIS  
NEW HOBART  
ARC WELDER"**

You can get all these advantages in the Hobart "Multi-Range" Arc Welder . . . with built-in electric motor or gasoline engine . . . or in a generator only so that you can use your own power unit. Mail the coupon for full details, without cost or obligation.

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WELDING CUR."

"ITS SUPERIOR  
STABILIZATION IS  
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SIMPLE AND POS-  
ITIVE POLARITY  
CHANGE SWITCH"

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LESS STICKI  
AND SPLATTER  
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OF OPEN CIRCU  
VOL."

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REMOTE CONTROL  
MEANS BETTER  
WELDING MAKES  
ANY JOB EASILY  
ACCESSIBLE"

"I LIKE IT'S LI  
DESIGN IT'S CONSERVATI  
HAS EXCEPTIONAL COPPER CONT  
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"WITH HOBART  
WIDE RANGE AND  
EXTRAORDINARY  
OVERLOAD CAPACITY,  
I CAN ALWAYS BE  
SURE IN TACKLING  
ANY SIZE JOB."

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Better to Buy a HOBART  
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BE SURE... learn the FACTS.  
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YES, YOU'LL SEE HOW  
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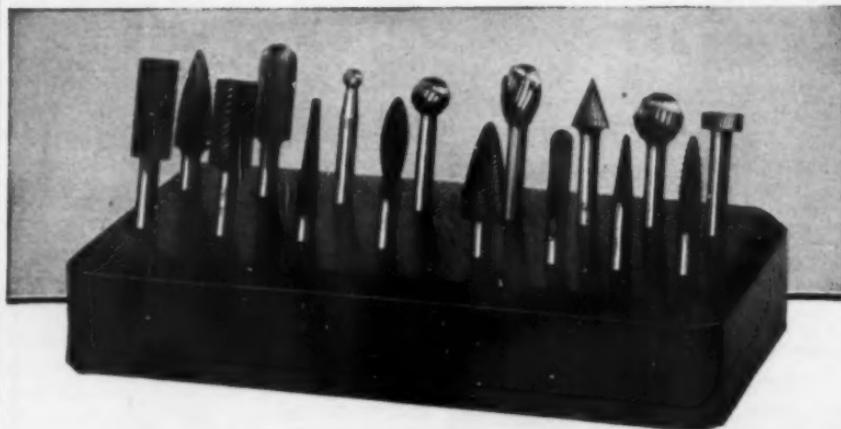
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# Burs and Rotary Files designed for the job!



## **GROUND BURS**

(High Speed Steel)

## **HAND CUT BURS**

(High Speed or Carbon Steel)

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(Carbon Steel)

**I**F YOU want clean, accurate work at minimum cost, be certain that you select burs that are suited to the work they are to do. MILL CUT burs are particularly adapted to soft metals—HAND CUT burs give better results in the tougher metals—the new KELLER "GROUND FROM THE SOLID" burs will give you real efficiency in any metal. The size and shape of the bur you use are important, too. That is why we have such a wide variety for you to choose from.

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**HARTFORD, CONN.**

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## *9 Exclusive Features*

1. All spindles running in standard ball bearings.
2. All revolving parts lubricated by oil bath.
3. Mechanical labyrinth oil seal to keep oil inside tapper.
4. Overflow plug makes oiling easy and over-oiling impossible.
5. All parts are interchangeable including actual frictions.

# NEW for 1938

6. Tap Chuck automatically goes into neutral when frictions are not engaged.
7. Double reverse speed with forward and reverse friction.
8. Adjustable side rod with spring lock.
9. Positive drive single purpose collet chuck, light in weight, extremely accurate. Collets available for all taps, sizes from No. 2 to  $\frac{3}{4}$ ".

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**The CHAS. L. JARVIS CO.**

MIDDLETOWN,  
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# KRW Hydraulic and Sensitive ARBOR PRESSES.

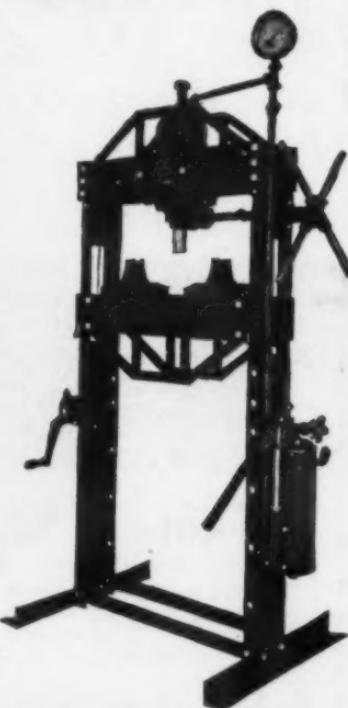
*New Improvements, Special Built-in Features and Lower Prices make them an outstanding value.*

THE last word in convenience, efficiency and ease of operation. Built extra strong and well braced, with steel trusses electrically welded, these presses will withstand strains that would cause presses of lighter and inferior construction to buckle or collapse.

Hand wheel for sensitive press operations has sliding handles which pull out to the ends for increased leverage. Work does not have to be changed from the work table as is the case with other make presses having a separate sensitive press unit mounted on the side or elsewhere.

The importance of this KRW feature as a time and labor saver can be appreciated. Also there is NO EXTRA CHARGE for this important built-in feature on a KRW Press. Work table can be raised easily with one hand. A strictly one-man Press.

*Write for literature giving full details and specifications of all KRW Arbor Presses.*



### PRICES F. O. B. FACTORY, ARCADE, N. Y.

No. 37—35 ton Hydraulic and Sensitive Arbor Press.....	\$150.00
No. 37E—50 ton Hydraulic and Sensitive Arbor Press.....	180.00
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Gauge and fittings, \$15.00 extra on all presses.

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*Lower YOUR  
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High Capacity  
Tool!*



## ... STANLEY No. 122 ELECTRIC DRILL

Easy to handle, easy to operate, the No. 122 Stanley Drill is a powerful, smooth running tool. Its  $\frac{1}{2}$ " capacity offers you a multitude of uses in repair, maintenance, construction, and production work. Seal type ball bearings carry radial and thrust loads. Specially heat-treated alloy steel gears insure long, trouble-free service. Chuck key held in gear housing. Removable pipe handle permits close quarter use. Universal AC-DC motor for any common voltage. Weighs 18 lbs.

**ASK YOUR STANLEY DISTRIBUTOR FOR A DEMONSTRATION; WRITE TODAY FOR DESCRIPTIVE LITERATURE.**

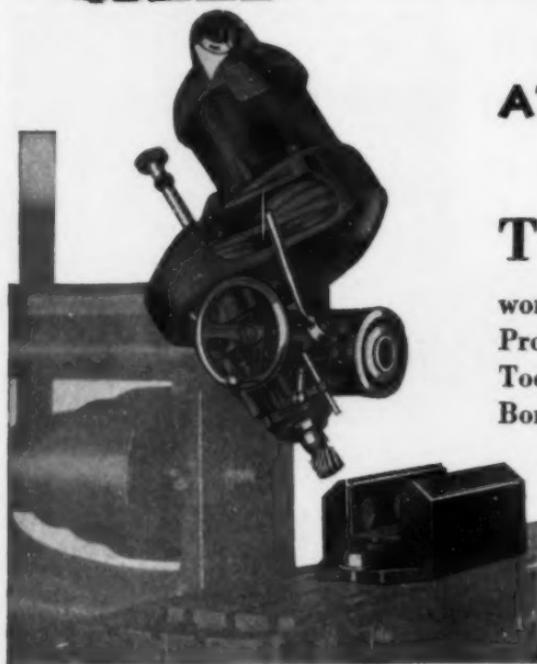
Stanley Electric Tool Division, The Stanley Works, 141 Elm Street, New Britain, Conn.



**STANLEY ELECTRIC TOOLS**  
"COST LESS PER YEAR"



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Bridgeport  
SPEED***



**"MASTER"  
MILLING  
DRILLING  
BORING  
ATTACHMENT**

THE Bridgeport "Master" has proved its worth whether it be on Production Applications, Tool and Die or Exacting Boring Work.

As a Tool Room Unit it will pay for itself in a very short time.

It is indispensable to the small tool shop owner who

for the first time can do fast milling and boring with a precision tool that does not involve a heavy financial burden.

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**1905**  **1938**

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VERTICAL AND HORIZONTAL TYPES  $\frac{1}{8}$ —TO 3 H. P. CAPACITIES

IT PAYS TO BUY HIGH QUALITY EQUIPMENT

TOOL AND DIE MAKERS MACHINE  
TYPE MY4  $\frac{1}{4}$  H. P.



RIGHT ANGLE HAND PIECE



IF YOU  
PURCHASE  
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"STRAND"  
YOU GET  
THE HIGHEST  
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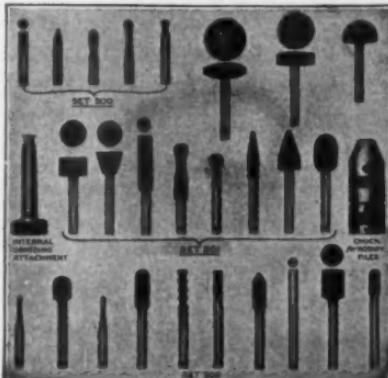
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MORE THAN THIRTY-THREE YEARS IN THIS INDUSTRY.

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CHICAGO

# Conway

## Clutch Sheaves

Here's another popular application of the versatile Conway Patented Clutch —for modern multi-V-belt drives.

In this, as well as the numerous other industrial applications, Conway Clutches are in step with the trend in modern machinery toward higher speeds and lighter weight.

Conway meets the new stress factors with sturdy steel plates that withstand sudden torques. The carrier is rugged and the husky actuating levers are pivoted to the rigid clutch carrier, in contrast to the practice of attaching levers to flimsy floating rings.

Centrifugal force, the traditional enemy of clutch performance, is utilized in the Conway to aid release and insure against drag. When the shifting cone is withdrawn to disengage the clutch, centrifugal force pulls out and holds out the levers, thus keeping the plates apart.

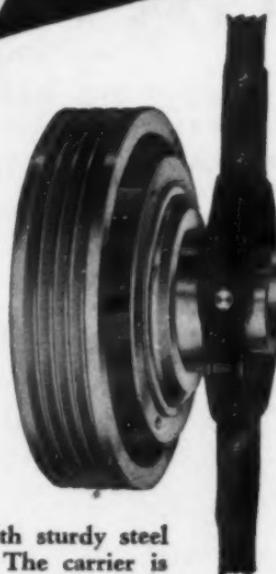
Safety and neatness are achieved by enclosing the parts usually dangerously exposed in other makes. All of the good, proved features of old type clutches have been modernized and retained.

Conway Clutches are conservatively rated—and we offer them to you as *the last word in friction clutches*.

*Quickmail Coupon No. 23 will bring your  
copy of the new Conway Catalog P-24.*

U. S. Patent No. 1,745,079; Canada Patent No. 287,414.

**THE CONWAY CLUTCH CO.**  
1541 QUEEN CITY AVE., CINCINNATI, OHIO



# WHITNEY TOOLS

A Dependable Line of Practical Tools for Practical Men. More than 80 types of Punches, Shears and other equipment for metal working, of which the items illustrated are representative.



No. 455 Angle Iron Combination Capacity 2" x 2" x 1/4". Angle Iron or Smaller

## Whitney JENSEN Portable Brake

### BENCH TYPE

#### *Two Models*

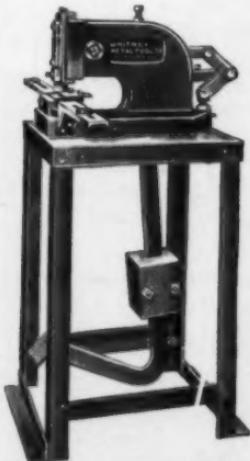
The Bench Type can be quickly converted to a Floor Type machine by the addition of a sub-base held with 4 bolts.



*"Air  
Conditioning  
Special"*

A brake you can carry to the job . . . weighs only 265 pounds . . . takes up to 49-inch widths in 20 gauge material . . . ample clearance at both ends of jaws for folded-up edges.

Quick-acting turnbuckle adjustment same as on our large brakes for different thicknesses of metal . . . makes reverse bends as short as 3/16 . . . graduated angle indicator on apron hinge lugs . . . has every feature of a standard brake.



## FOOT PRESSES

Made in four sizes — Nos. 28-9 with 7 and 10 inch throats respectively — Nos. 58 and 68 with 18 and 24-inch throats. Capacity, 2-inch hole in 16 gauge. Double angle notching punch and die supplied with machines at slightly higher cost. Several customers claim to have earned the cost of these punches during the first month's use.

*Quickmail Coupon No. 42 will bring you the complete Whitney Catalog.*

**WHITNEY METAL TOOL CO.,** **ROCKFORD,**  
**ILLINOIS.**

*... Renu* RECLAIMED  
TOOLS LOOK RIGHT

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our new 16-page  
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the whole story.

because only used tools that will pass numerous tests, including the Brinnell Hardness Test, are recut by RENU. Send us a trial order. WE GUARANTEE THAT EVERY TOOL WE SALVAGE WILL GIVE NEW TOOL PERFORMANCE—AT A FRACTION OF NEW TOOL COST.

\* AGENTS—Some  
valuable territory  
still open—write.

*Renu* Tool Co., 275 E. Milwaukee Ave., Detroit, Mich.

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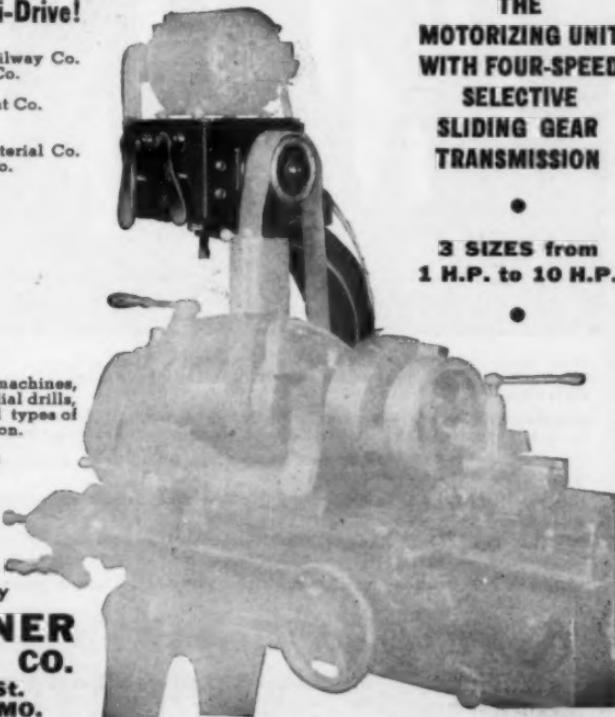
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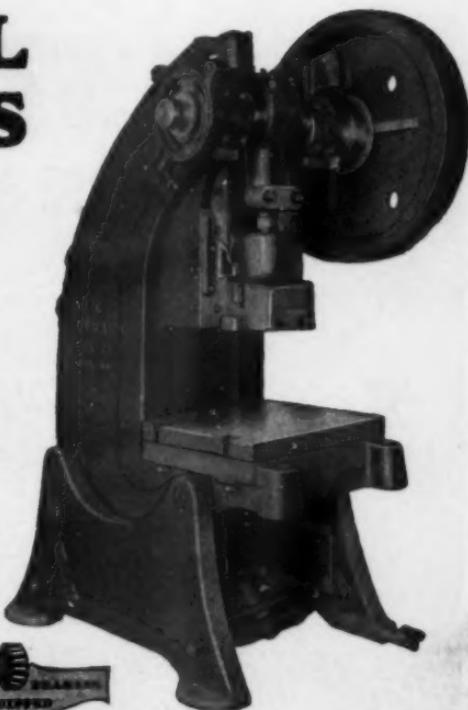
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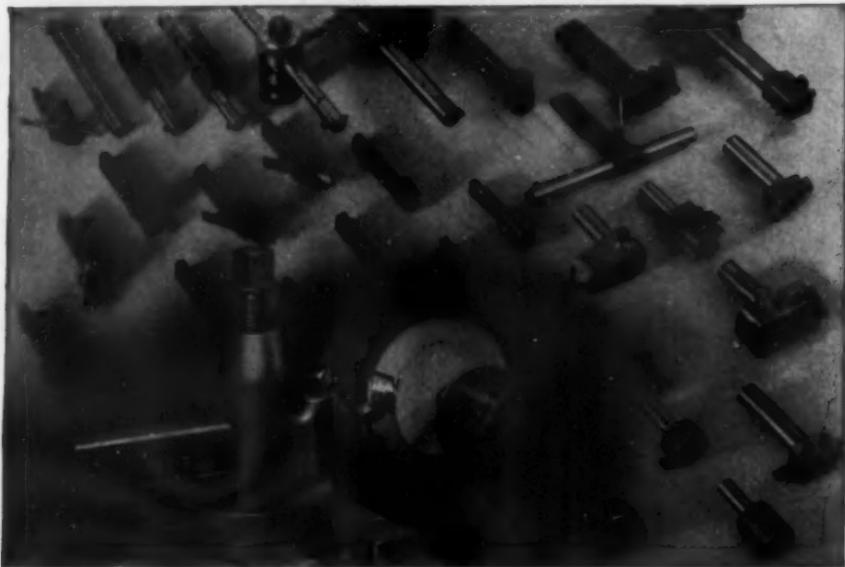
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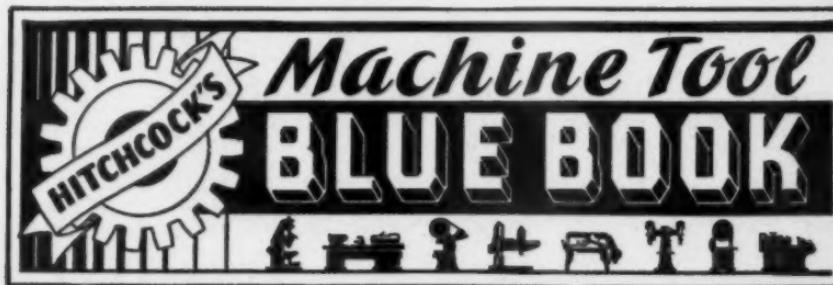
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## IDEAL LUBRICATION

By WM. F. EPMEIER, Vice-President  
Timesaver Products Company, Chicago

**F**EWER subjects related to the design and construction of machinery are of greater importance than the problem of bearing lubrication and the reduction of friction and wear. The importance of this subject has been especially emphasized in recent years, during which it has been necessary for the manufacturers of mechanical devices to meet the demand for equipment capable of higher operating speeds.

To endure higher running speeds, the bearing, whose function it is to support the rotating or oscillating members of the assembly, must possess the necessary properties to promote ideal lubrication and free movement of parts under a variety of operating conditions. The lack of these qualities causes the generation of excessive friction and heat, resulting in seizure, destruction of bearing surfaces and costly replacement of parts.

During the advances made in bearing mechanics, more attention has been paid to lubricants and lubricating systems than to the mechanical properties of the bearings. Regardless of lubrication, mechanical imperfections such as surface irregularities, lack of alignment and improper oil clearance, prevent the formation of a uniform film of oil, the lack of which is responsible for metal to metal friction, the cause of most bearing failures.

Since the elimination of friction is

necessary to prevent the destruction of the bearing surface, it is well to consider the requisites of ideal lubrication and bearing movement. Ideal lubrication and minimum friction are said to exist when the bearing surfaces that move in intimate contact with one another are held apart with a uniform film of oil of sufficient thickness to prevent metal to metal contact. To realize this freedom of motion, engineers have discovered that certain fundamental laws pertaining to metal structure, construction, operation, assembly practice, as well as fitting procedure, must be observed to obtain ideal lubrication.

### Bearing Faults

Construction discrepancies that are responsible for most bearing trouble and failures are:

Use of improper bearing metals.

Structure of bearing metal destroyed by fitting methods.

Improper oil clearance.

Rough or irregular bearing surfaces.

Misalignment of parts.

Presence of imbedded abrasive or other foreign matter.

Since the lubrication of bearings is a problem in itself, the application of the known laws, related problems and their solution, can best be discussed

in the order in which they present themselves.

### Bearing Metals

The first factor to be considered in the construction of bearing surfaces is the selection of bearing metals. The only mechanical or physical test of a bearing alloy is that of determining whether the metal has a sufficient factor of safety against possible distortion while in service. All other characteristics, such as crystalline structure, fusing temperature, etc., are of microscopic or chemical nature.

Experience proves that generally, a single, homogeneous metal is not suited for bearing purposes, the requirements being that bearing metals be composed of at least two unlike metals that will intermix while in a molten state, and upon cooling, form a crystallized structure of alternately hard and soft particles of unlike wearing qualities. Babbitt and bronze are alloys of this type. The duty of the hard particles is to support the load and resist wear, while that of the softer material is to permit the hard crystals to adjust themselves to the load requirements. Also, the softer crystals are more easily abraded, consequently, wear slightly below the surfaces of the harder particles, forming microscopic depressions or pockets for the retention of the lubricant. This condition is especially beneficial when the machine is suddenly started following an idle period, during which the surplus lubricant has had the opportunity to drain from the bearing surfaces. Under such conditions the microscopic depressions supply sufficient lubricant to prevent scoring until the proper oil film is formed by the restoration of normal lubrication.

While the selection of bearing metals of sufficient strength and of proper microscopic structure is highly important, ideal bearing conditions cannot possibly exist if the final fitting methods result in surface conditions that defeat the purposes of the bearing alloy and the lubricant.

In order to obtain the full value of bearing alloys, it is necessary that the alloy be presented to the member it supports with its natural crystalline

structure undestroyed. The bearing surfaces should be smooth and yet not glazed, and of exactly the same contour as that of the member supported, with an allowance of sufficient clearance between members necessary for oil film maintenance. The natural, open-pored, oil retaining qualities of the bearing alloy should be preserved by the avoidance, so far as possible, of harsh scraping, reaming or similar fitting methods that tend to drag and rupture the surface structure of the alloy, as mutilation of this kind compresses and crushes the particles of the metal structure to such an extent that the bearing metal value is destroyed.

### Fitting Methods

To meet the demand for a scientific fitting method that is ideal from the standpoints of commercial practicability and operative perfection, a system of bearing surface fitting, involving the use of an abrading compound was introduced a number of years ago. This abrading or lapping system of bearing finishing is so simplified that an inexperienced operator can obtain excellent results by following printed instructions. While an abrasive in action, the extraordinary features of this compound, which take it out of the field of the usual grinding materials, are its non-imbedding qualities and its faculty of breaking-down from an abrasive to a non-abrasive material. The abrading action is rapid at first, gradually diminishing as the abrasive particles break down into inoperative material. Renewed cutting can be obtained only by a fresh application of compound.

The lapping operation is easily accomplished with the compound which is prepared in powder form to be mixed with oil as used. The mixture is then applied to the surfaces to be lapped, in a convenient manner in the form of a very thin paste. The abrasive action is such that the surface irregularities and surplus metal are gently but quickly removed, yielding perfect fitting bearing surfaces that are free from imperfections, such as imbedded abrasive particles, microscopic ridges and grooves, with the undisturbed crystalline metal structure ex-



Fig. 1

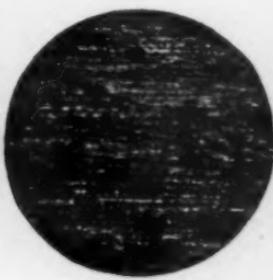


Fig. 2



Fig. 3

posed in an open-pored state.

This lapping compound may be used not only for the fitting of all types of round bearings but for the smoothing of surfaces such as lathe and planer ways; the grinding of poppet and plug type valves; the finishing of reciprocating parts such as piston to cylinder walls; the grinding and fitting of metal and bakelite gears with herringbone, worm or spur types of teeth; the freeing of binding bearings while the machine is in motion, and, in fact, upon any type of bearing surface where ideal running conditions are desired.

Photomicrographs of bearing surfaces that have been finished by frequently used methods are shown in Fig. 1 and 2, and a comparative surface finished by the lapping-in method is shown in Fig. 3. Fig. 1 shows a surface which is the result of the reaming method, magnified to show mutilation of metal structure. Fig. 2, while somewhat smoother than 1, shows a file-like surface caused by grinding with a wheel. Fig. 3 presents an ideal bearing surface produced by

the lapping method. Note the open-pored structure of the metal and freedom from scratches. Fig. 1, 2 and 3 are taken under the same magnification of 100 diameters.

The requirements for ideal lubrication may be stated as a continuous, uninterrupted film of oil of sufficient thickness to separate the bearing surface and the member that it supports. Tests have shown that the friction ratio increases rapidly whenever the oil film is broken by an imperfection in the bearing surface. It is therefore readily seen why a bearing such as shown in Fig. 4 cannot be lubricated properly. This bearing, which was fitted by the scraping method, presents a surface of high and low spots and scraper gouges which cause oil film interruption. This is not the only detrimental feature of the scraped bearing surface, insofar as it is necessary to set the scraped bearing halves extremely tight to the shaft to allow for the wearing down of high spots before normal operation can take place. During the wearing-in process, ex-

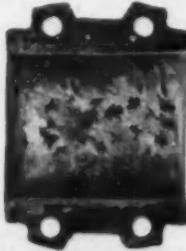


Fig. 4

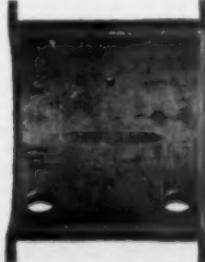


Fig. 5

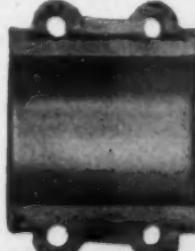


Fig. 6



Fig. 7

treme care must be observed, otherwise binding and over-heating will result. Fig. 5 shows a bearing half that was removed from a new, expensive automobile and photographed. Notice the high spots that are accentuated by the rubbing of the crank-shaft. Markings such as these indicate metal to metal contact and consequent lack of lubrication. Fig. 6 shows a bearing half that was lapped to a precision fit by the lapping method previously described. Surfaces prepared in this manner are in perfect alignment, and of exactly the same contour as the member with which they operate, as they are lapped and fitted to conform to one another in their final operating position.

#### Clearance

As an oil film of adequate thickness is a necessary requisite for perfect lubrication, a space or clearance of proper dimensions, between surfaces which are in sliding contact, must be provided. Such a space is difficult to calculate as it is impossible to measure an oil film. Tables pertaining to the necessary clearance required for bearings of various dimensions are given in handbooks listing mechanical specifications. These dimensions however, are somewhat theoretical and are more generally arrived at by the trial and error method. Experience has proven that the lapping method produces an oil film clearance of exact dimensions necessary for freedom of motion and oil film maintenance. When the surfaces are lapped and mated in this manner the abrading action of the compound and the removal of metal continues as long as pressure and re-

sistance to motion exists. As soon as free movement is obtained by the removal of irregularities and surplus metal, the abrading action diminishes, resulting in smooth surfaces with proper running oil clearance. Surfaces finished in this manner eliminate the necessity of a running-in period and the scoring dangers related thereto.

#### Gear Lapping

Regardless of accuracy or precision in the cutting or assembly of gears, practiced by modern engineering methods, gear noises frequently occur as a result of machining inaccuracies or misalignment in final assembly. These difficulties can be overcome by use of the lapping procedure previously described, which will definitely correct the vibration and noise caused by improper tooth contact. Quiet operation, superior finish and full tooth contact can be secured on all types of gears of the various metals which are used in transmission assemblies, speed reducers and elevator hoists. The fitting can be done either by lapping the gears in a fixture or after assembly, as the non-imbedding, self-eliminating nature of the compound prevents excessive or continued cutting from possible remaining abrasive particles.

The bronze worm wheel pictured in Fig. 7 was lapped to the steel worm while in final assembly. Perfect tooth contact and an ideal finish was obtained on both wheel and worm by the lapping method. A grade of compound is manufactured especially for combination steel and bronze lapping of this type, the use of which gives proper tooth contact by abrading the bronze wheel only. The compound's abrading



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action affects the softer bronze wheel, having only a polishing effect on the harder steel unit, thereby eliminating the danger of cutting a shoulder in the worm.

In the past, when machinery was designed with heavy parts and large bearings, to operate at a comparatively slow rate of speed, bearing design was a problem of secondary consideration. The trend to high speed and light weight equipment however, has created the demand for a precise method of bearing production that will assure freedom of movement, minimum wear and low operating temperatures under extreme and varied operating conditions.

Many representative manufacturers, after extensive tests, have approved and made the lapping method, heretofore described, a regular production operation. As evidence of the merits

of this compound and system involved, reference is made to the following report on tests of this particular lapping compound made by U. S. Naval Experiment Station, Annapolis, Md., at the request of the U. S. Bureau of Engineering, Aug. 22, 1930.

Test No. 4387—Paragraph 18:

"Tests made of \_\_\_\_\_ lapping compound bear out the claims of the manufacturers that this compound does not imbed in the metal on which it is used, and that it quickly breaks down from an abrasive, first to a polishing compound and then further to inert material. These qualities allow its use where normally an abrasive could not be thought of, because particles of the ordinary abrasive could not be fully cleaned out of the machine, and might continue to grind or scratch when or where such action would not be desired."

## Physical Characteristics of Solder Alloys

**S**OFT solders are practically always alloys of lead and tin. (Small proportions of antimony are frequently used.) Variations in the alloy compositions have a material influence on the physical characteristics of the mixtures.

Fig. 1 is a curve of freezing points of lead-tin alloys. The usual solders range between 35% tin to 63% tin. A relatively high tin content results in a low freezing (melting) point, but because of the very high price of tin in comparison with lead, tin is used as sparingly as possible in commercial solders.

The alloy of lowest melting point—183-degrees C., results from the eutectic\* composition of 63% tin, 37% lead. The familiar "50-50" solder has a freezing point about 55-degrees C., higher than the eutectic. Unfortunately, many solder specifications allow a variation of 5% from nominal composition so a 50-50 mixture may actually be 45% tin, 55% lead with a freezing point 70-degrees C., above the eutectic.

Compositions near the eutectic are of much use to the instrument maker for reasons other than low freezing point. These have very sharp freezing points.

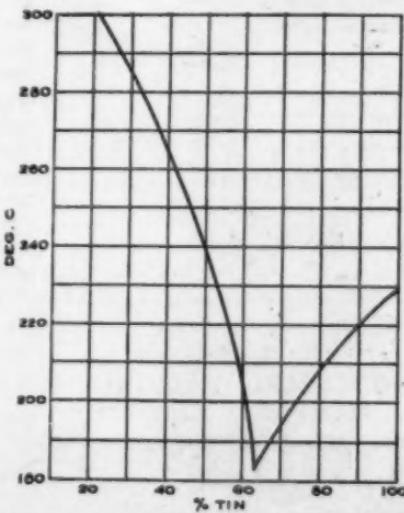


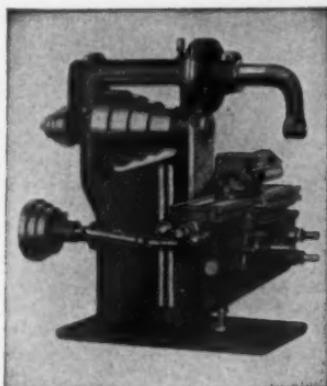
Fig. 1—Melting points of lead-tin solders.

\*Eutectic—a compound or alloy having a lower melting point than that of any of its constituents alone.

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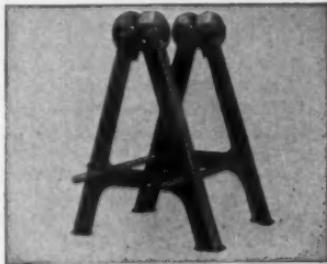
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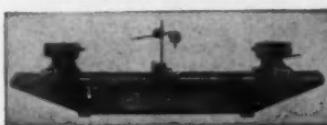
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As the composition departs from this ideal, there is a plastic or mushy range of temperature where the solder is neither fluid nor solid although it may have the appearance of being solid. A curve of this plastic range is given in Fig. 2. A composition of 50% tin, 50% lead has a plastic range of 55-degrees C., and a composition of 40% tin, 60% lead has a plastic range of 83-degrees C. Small wires and delicate parts are soldered best with a composition that approximates the eutectic—from 55% tin to 63% tin. An actual content of 60% tin, 40% lead is an almost ideal instrument solder because of its low freezing point and its very small range of plasticity. Such a solder is rarely available because of its relatively high cost. The addition of antimony in small percentages does not materially change the freezing point and the mushy range curves that are given in these two figures.

Production operations involving the soldering of relatively small wires to studs or to other wires can be done with greater certainty and with fewer losses with a 60/40 solder than with the more usual 50/50 which so often contains only 45% tin. The fact that a joint is solid when it appears to be, more than compensates for the increased cost of the high tin content.

Plumbers' solder and solder for "wiping" joints has a low tin content (generally about 40%) to give a long plastic range. It would be difficult to "wipe" a joint with a 60 or 63% tin alloy because of the quick freezing of the solder once the 183-degree C. point is passed. The plumber thus takes advantage of the long plastic range of low tin, high lead content. The requirements of the plumber are just the reverse of the instrument maker.

Where solder is kept fluid for dipped work, the containing vessel should not be of copper or a copper alloy, as copper dissolves rapidly in the molten solder, resulting in a bronze type alloy of little use as soft solder.

Fluxes for tin-lead solders are a little understood branch of industrial chemistry. The most active conven-

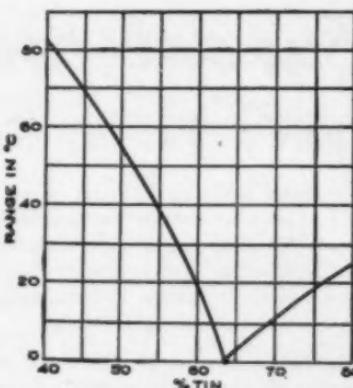


Fig. 2—Plastic range of lead-tin solders during solidification.

tional fluxing agent is zinc chloride with some free hydrochloric acid. Pure zinc chloride in water or alcoholic solution, zinc ammonium chloride, ammonium chloride, resin, tallow, lactic acid, etc., are used. These are listed in decreasing order of activity. Many so-called non-corrosive fluxes are zinc chloride compositions in which a grease carrier or a neutralizing agent is used to reduce the very active corrosive action of zinc chloride. Most of these fluxes are unsuitable for small and critical work. Resin fluxes work reasonably well with copper where the parts are clean. They require a relatively high soldering temperature and great care to prevent frozen joints. They are the most inert of the more usual fluxes. "Solderux" fits into the soldering activity series just after zinc chloride, and heads the list for non-corrosiveness. It is asserted to be extremely active in promoting good joints and completely inert at room temperatures. In soldering ability, the fluxes are rated: acid zinc chloride, "Solderux", ammonium chloride, resin, lactic acid and tallow. In resistance to corrosion, "Solderux" heads the list followed by resin, tallow, ammonium chloride and zinc chloride.

Editors note—the foregoing is reprinted with permission from "Shop and Laboratory", the interesting house organ of the Micro Instrument Co., Cambridge, Mass., makers of a line of precision scientific instruments and incidentally distributors of "Solderux".

# Modernize with Berkeley Drives

Consistently ahead of the field in developing motorized unit drives, Berkeley introduces the V-Belt-Helical Gear Combination with Tension-trol

NOW . . . Berkeley offers a combination V-Belt and Helical Gear drive which retains all the advantages of both types without any of their limitations.

By means of the new Tension-trol (multi-range tension control mechanism), you may obtain exactly the belt drive tension required.

Result: improved power transmission . . . increased belt efficiency on long or short centers.

Any desired speed reduction is obtained without loss of flexibility of belt drive—quick change shortens "down time".

*Resilient V-belt connection results in 25% greater load capacity and, equal percentage of added life.*

Built to outlast the machine, Berkeley Drives are readily attached by four bolts, and screw adjustment for lining-up. These surprisingly-low-priced "Standardized Special" Motor Drives become an integral part of your lathes, drills, grinders, shapers, milling machines.

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Quickmail Coupon No. 15 will bring your copy of the new Berkeley Catalog.



**BERKELEY ENGINEERING CO.**  
1381 E. 17th ST., CLEVELAND, OHIO

# Comments From The Editor

## Another Aviation Milestone

All honors to airman Hughes and his companions for their successful dash around the globe. In every way it was a brilliant accomplishment.

The machine tool industry is entitled to a considerable measure of satisfaction over the exploit. The steady improvement in plane performance down through the years has reflected the constant advance in precision tools and production methods—in the finer finishing of intricate engine parts and closer tolerances.

It doesn't seem so long ago that airplanes were merely hippodrome attractions, grounded on windy days. Many historical milestones in flying have been recorded since Bleriot barely cleared the English Channel and Glen Curtis soared down the Hudson.

Flying progress has been measured by improvements in materials and engineering developments in engines, ships and instruments. Many of these advances have been dependent upon tool developments. In fact, better tools have helped to make better flying—conquering formidable problems in building the fast, powerful, dependable modern engines.

We've come a long way in planes and tools since the Wright Brothers first skimmed over Kittyhawk—and it is safe to assert that continued improvements and refinements in machine tools will contribute fully as much to the future of aviation.

## A Brighter Outlook . . .

While there has been no decided

upward surge in business, still the general feeling is better. The psychological effect of market advances was bound to help business and already the upturn has carried prices well above the panic and gloom levels. Despite unemployment, consumption in many lines was at a higher rate than production. Inventories were reduced and in some instances depleted. A definite upturn was marked when merchants and jobbers were compelled to re-enter the markets. Pump priming and all the administration's efforts to make a favorable pre-election showing should help generally. Adjustments will have to be made, and while progress in some lines may be slow for a while, yet the signs all point onward and upward, with a substantial gain by early Fall, if not before.

## The Best Things of Life . . .

Money cannot buy real friendship—it must be earned.

Money cannot buy a clear conscience—square dealing is the price tag.

Money cannot buy the glow of health—right living is the secret.

Money cannot buy true happiness—happiness is a mental attitude. One may be happier in a cottage than in a mansion.

Money cannot buy inward peace—peace is the result of a constructive philosophy of life.

Money cannot buy character—that is what we are when we are alone with ourselves in the dark.

*Announcing*

A NEW POPULAR PRICED  
STARRETT INDICATOR

*"Universal Junior" No. 564*

Here is an indicator that is sensitive, accurate, flexible and adaptable to practically every conceivable indicating operation. It is made to Starrett standards of precision and workmanship and sells for only five dollars.

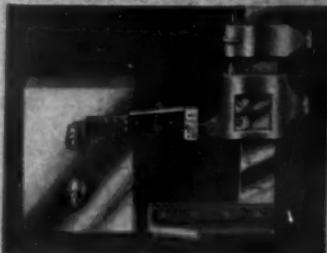
Ask your regular distributor to demonstrate this new Starrett Indicator or write for "Universal Junior" Folder <sup>no K</sup>.



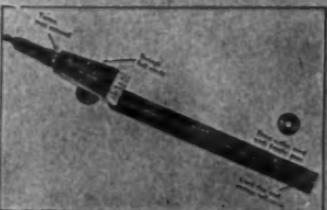
COMPLETE FLEXIBILITY is shown by indicator mounted in lathe tool post. Point which is frictionally held in rotating sleeve can contact work at any angle.



GRADUATED SCALE, with a range of .012 by thousandths, can be set in preferred position by mounting indicator on side or top of shank.



ADAPTABILITY illustrated by indicator removed from shank and clamped to jaw of height gage.



ACCURACY is assured by simple design and careful workmanship. Indicator is 2 1/2 inches long, shank 5 inches. Case-hardened steel and die-cast parts.

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*Send Quickmail Coupon No. 31 TODAY for  
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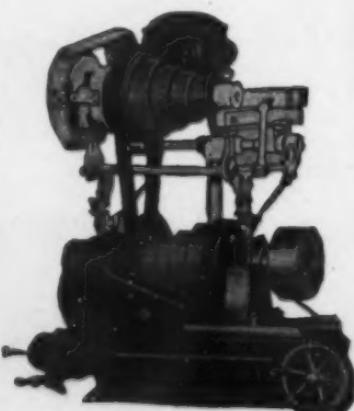
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# MOTORIZE—SPEED UP! with REMCO MOTOR DRIVES



A Remco user writes . . . "another im-  
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greater production can be had due to the  
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the belt tight and the machines at their  
production peak" . . . Install Remco  
Drives in your plant if you want more  
output, lower power costs, increased  
safety, reduced noise, rent-saving from  
a more compact shop layout.

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# WHAT'S NEW in the industry

by Wesley G. Paulson, Editor

## American Type T 3-Way Broaching Machine

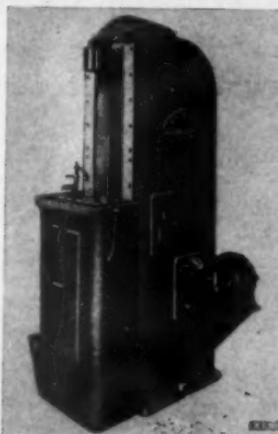
American Broach & Machine Co., Division of Sundstrand Machine Tool Co., Ann Arbor, Mich., announce a new vertical hydraulic broaching unit, —a universal machine for push down, pull down or surface broaching. The unit is particularly useful where different classes of work are to be broached in limited quantities, and where the changeover from one type of operation must needs be made quickly and without sacrifice of efficiency.

A four page 2-color bulletin gives detailed descriptions of the mechanical features. Typical jobs are also illustrated and explained.

A push down job is shown in which the internal broaching operation contemplates finishing the four spiral splines in a bronze nut. Broach is held in the connecting head, fastened into the accurately tapped and counter-bored hole of the push lug. The broach shank has a flat so that it is held in lock position in the connecting head by a set screw, which prevents turning. The work rotates to accommodate the spiral angle of the broach by means of a thrust bearing in the bottom of the work seat in the fixture.

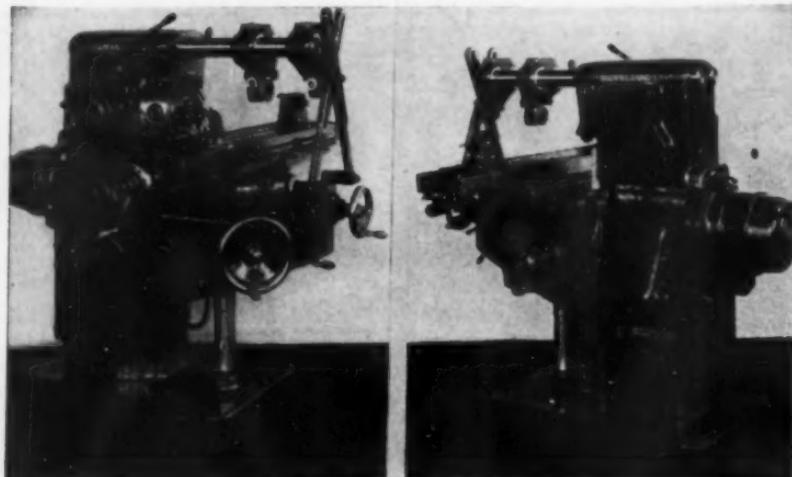
In the pull down operation, a hole is being broached in a coupling flange. The American four jaw broach puller

is assembled in the pulling lug, with broach shank attached, pulling the broach through the cut. When the broach passes entirely through the work the machine stops.



In the surface broaching job, the block type stationary fixture holds four collars. These parts have spline holes which are used for location on the two spline studs, thereby eliminating the necessity of clamping these parts in the fixture.

For complete details as to these operations, as well as specifications and full information pertaining to the machine and its capabilities, please address the makers, mentioning The BLUE BOOK.



## Brown & Sharpe No. 2 Universal Milling Machines

Addition of two new milling machines to their line is announced by Brown & Sharpe Mfg. Co., Providence, R. I., to be known as the No. 2 universal milling machine (light type—with power fast travel) and No. 2 plain milling machine (light type—with power fast travel).

These new machines incorporate moderate weight, ease of handling, ample rigidity and modern construction characteristics of the Brown & Sharpe "light type" design. In addition, they have power fast travel of 76-in. per minute in all directions provided by a totally-enclosed constant-speed motor built into the right side of the knee, and obtained (in any direction of feed engaged) merely by touching a switch button at the front of the knee. When the button is released, the table resumes its original feed movement. Since power fast travel is independent of both spindle and table feed drives, it is available at all times. The construction and location of the control button gives ease and simplicity of operation, and at the same time provides protection from grit, coolant and accidental engagement.

The transverse and vertical adjustment handwheels are each automatically disengaged when power feed in the respective direction is engaged; while for longitudinal adjustments, a safety handcrank is provided.

An automatic lubrication system in the knee provides intermittent oiling for all mechanisms in the knee; while the table driving mechanism, table ways and bearing surfaces at the top of the knee are lubricated at each movement of the longitudinal feed engagement lever. The one-piece knee screw is enclosed in telescoping guard and is automatically lubricated.

Capacities:—longitudinal feed, 28-in.; transverse feed, 10-in.; vertical feed, 15-in. All feeds automatic. On universal machine; centers swing 10-in. diameter, take 28-in. length.

Please mention the BLUE BOOK when writing for further details.

## Landis Issues New Mailing Piece

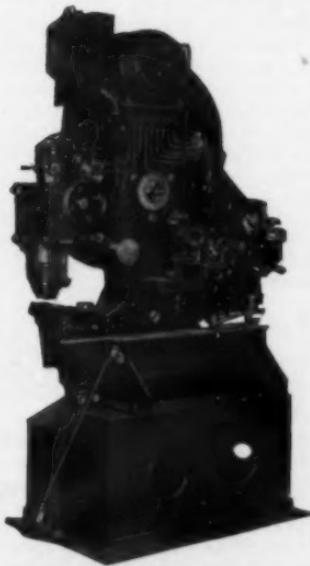
Landis Machine Co., Inc., Waynesboro, Pa., offers a new broadside with the intriguing title—"Here's One Way for Your Plant to Make a Profit Now." Landis threading equipment is listed and details of the new Landis Survey Plan are explained. Copies may be had on application.

# You Can't Beat a V12 with a "One Lunder"



**—and you can't make money**

in your iron working department by trying to get along with slow, obsolete methods. That's why so many plants are replacing old methods with



*"Buffalo"*

## UNIVERSAL IRON WORKERS

• These sturdy machines with their "Armor-Plate" frames are making light, fast work of punching, shearing, slitting, coping, notching, and bar-cutting operations. A wide range of standard sizes to handle angles, tees, rounds, squares, all structural shapes and flat steel.

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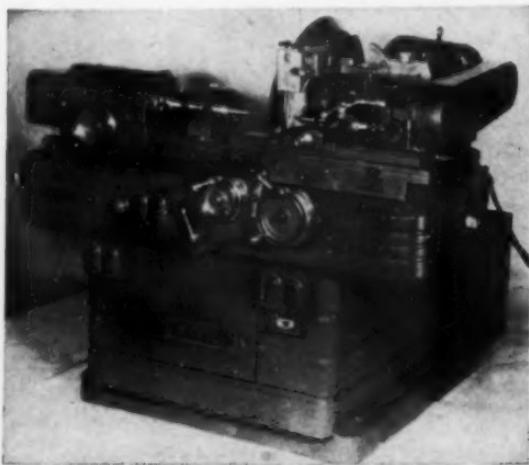
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**COMPANY**  
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**Ex-Cell-O  
Announces  
Improved  
Precision  
Thread  
Grinders**



Designed for further flexibility, productivity and accuracy in precision grinding of threads in regular production, Ex-Cell-O Corp. has added numerous improvements and refinements to its series 31 precision thread grinders.

These include such items as a newly developed built-in taper grinding attachment, an increase in the number of grinding wheel speeds, provision for using grinding wheels from 12 to 18-inches in diameter, a new electrical system, improved coolant system, etc.

The wheel slide has been designed for mounting a built-in taper attachment. A bracket with a set of rollers is fastened to the table with the rollers contacting interchangeable cam plates for various taper angles. The device causes the entire grinding wheel head assembly to move forward and backward on its slide at right angles to the work axis. It will also handle combination taper and straight work or special shapes. The cam plate itself is held to the wheel slide with two screws, the screw holes in the cam plate being elongated so that the cam plate may be adjusted and backed against the wheel slide. The taper attachment will take care of tapers up

to 1-inch included taper per foot.

The new units are designed to grind in both directions, eliminating lost time during return traverse. Manually operated diamond dressers are provided to overcome time lost and grinding wheel wastage with automatic dressing. Wheels can be dressed without slowing down, it having been found that variations in dynamic balance of commercial grinding wheels change the running conditions of wheels and the form of threads at different speeds.

Dresser is on the same side of the work as the grinding wheel, and can be set to true the grinding wheel so that the work is always automatically finished to size.

Of particular interest is the provision for maintaining the desired surface speed with different sizes of grinding wheels. This is appreciated as wheels wear down. By means of two-step interchangeable pulleys for both wheel and motor spindles, furnished with the machines, a given surface grinding speed can be obtained for any wheel size from 12 to 18-inches, in increments of one-inch. 7000 surface ft. per minute is recommended for 29° and Acme threads and 9000 surface feet per min-

ute for 60°, U.S. and sharp V threads.

The heavier work head, now equipped with two Ex-Cell-O precision bearings, is driven from a two speed motor through worm gearing. Four-step pulleys on both the motor and work spindle provide a range of eight work spindle speeds, ranging from six to 60-r.p.m. The motor has a reversing and a plugging switch, and is rated at 1-h.p. at 900 and 2-h.p. at 1800-r.p.m. Speed is controlled by selector switches conveniently located at the front.

An adjustment for tension on the tail stock center allows for variations in light or heavy duty grinding of long and short work, etc. Cross-feed hand wheels are graduated  $2\frac{1}{2}$  instead of 5-tenths of a thousandth, indicating the increased accuracy possible.

Coolant tanks of 50-gallons capacity are at rear of base, accessible for daily cleaning. The  $\frac{1}{4}$ -h.p. coolant pump is externally located at top of tank.

Work is driven directly from the master lead screw without intermediate gears. Therefore no lead compensation is required.

Increased flexibility of operation is well illustrated by the electrical system provided, controls for which are located on the front. The group at top, left, comprises an emergency stop button, which shuts off all motors on the machine, while the two other sets of buttons control the reversing or stopping of the work table. The table can be set to reverse continuously or stop at the end of each stroke. The latter permits grinding close up to shoulders, when it is necessary to bring the table automatically to an abrupt stop.

Below this group are two sets of buttons, for starting and stopping both the wheel head and coolant pump motor; the other for operating the work head motor, independently. This group shown to the right permits using either fast or slow table movement in either or both directions, with a right or a left hand lead screw. Below this is a switch to reverse the machine wiring for left or right hand lead screws. The limit switch for controlling reversal of the table is operated by adjustable dogs shown on front of the

table.

Included in the attachments are a no-lead device for grinding of annular grooves, etc. and a back-off attachment.

Other features include: — heavily ribbed base; hardened and ground wheel spindle; hand lever for quickly disengaging wheel from work at end of the cut; hardened and precision ground lead screws with split bronze nuts to permit taking up for wear—with lead screw reversible in its mounting to further distribute wear evenly over the entire screw; positioning device on work head for quick locating of previously roughed threads in relation to the grinding wheel; horizontally adjustable, hardened and ground V-shaped steel ways for the table, which rides on hardened, ground, and lapped steel rollers; work spindle nose provided with tapped holes for attaching indexing fixtures, etc.

For further details, please address, Ex-Cell-O Corp., 1188 Oakman Blvd Detroit, Mich.

## CUTS CLEAN

Whether it's a straight, circular or irregular job, the BEVERLY SHEAR gives a clean, sheared edge without knurl or distortion — and with minimum effort.

Made in two sizes, either of which may be carried in a tool box — No. 1 weighs  $16\frac{1}{2}$  lbs. and cuts up to 14 gauge.

No. 2 weighs 32 lbs. and cuts up to 10 gauge.

*Reasonably priced—send for descriptive circular*

**THE BEVERLY SHEAR CO.**  
3007 W. 110TH PLACE,  
CHICAGO, ILL.



## Cimatoor Gear Burrung Machine

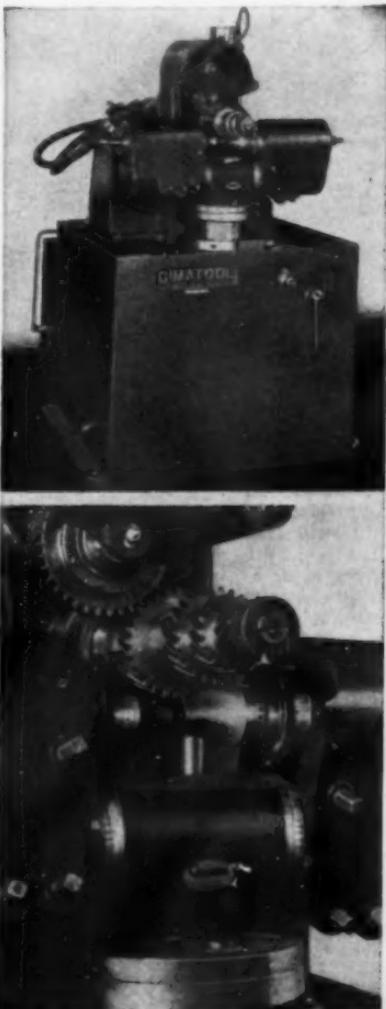
The Cimatoor Co., Dayton, O., announce development of a new 2-B unit for accurate burring of gear teeth at speeds up to 800 teeth per minute. Utilizing a fly cutter on each of two cutter spindles, the unit is engineered to burr both sides, or front and back of gear teeth on gears up to 8-inches o.d. Other models are available for gears of other sizes.

The main drive is multiple Vee belt, and speed changes are made rapidly by changing pulleys. The main drive revolves two trains of constant mesh gears, one of which drives the two cutter spindles mounted on a vertical column (vertically adjustable 3½-in.) in the center of the machine, in which the cutter spindle drive-shaft is enclosed. The cutter spindles are mounted horizontally and opposed, and each may be adjusted laterally toward and away from each other 1½-in., and from front to rear through a 60° arc to obtain practically any burred gear tooth face within capacity of the machine. The quick change "timing" adjustment for set-up is conveniently located on each cutter spindle, allowing adjustment as fine as 1/600th of a turn.

The work gear indexing idler swings upward and to the left to accommodate different sizes of gears. This idler is driven through the second train of constant mesh gears already mentioned, and is said to be positively synchronized with the cutter spindles so that the machine cannot get out of "time".

Another unique feature is the automatic cycle control which stops the spindles in such a position that the work may be unloaded and loaded without interference from the cutters or manual positioning of same.

Timken Tapered Roller Bearings are used throughout. Pressure lubrication is provided for all bearings and points where wear may occur. The coolant system is built-in. Clamping of the work is optional and may be accomplished by means of a manual



hydraulic or air operated fixture.

Changeovers are quickly and easily effected, since only a change in pitch can make necessary a change in the idler gear. Gears of identical pitch with different numbers of teeth only require adjustments and simple adapters.

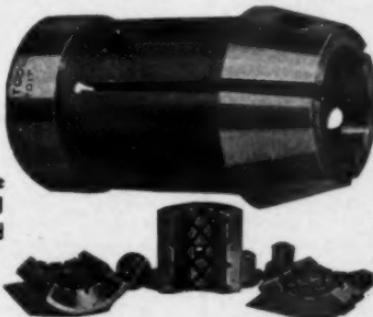
# To Improve Screw Machine Production



**S**UTTON DIAMOND-GRIP Collets offer advantages worth looking into. They grip tighter under less tension, with less wear on machine and collet. Their clean-cut Diamond Serrations clear themselves of dirt, scale and chips. Their positive grip reduces spoilage due to slipping.

### DIAMOND GRIP COLLETS

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Master Collet with Diamond-Serrated Pads

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**SUTTON TOOL CO.** 2842 W. Grand Blvd., DETROIT, MICH.

Only Sutton Diamond-Grip Collets are Diamond - Serrated

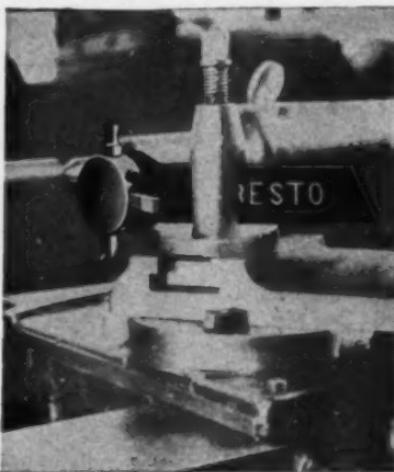
## Rockford Hy-Draulic Slotter Bulletin

A bright four-page, two-color folder No. 383, sets forth in a comprehensive and interesting way, the highlights of the new Rockford Hy-Draulic Slotter, 20-inch rating, 36-inch stroke. The bulk of slotter work is big and heavy, and heretofore slotters have been comparatively slow moving and cumbersome. The new unit is described as big, powerful, fast, easy to operate and

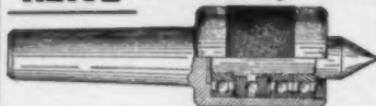
highly efficient. Its many advanced features are illustrated and enumerated in the bulletin, copy of which may be had by addressing the Rockford Machine Tool Co., Rockford, Ill.

### Presto Tool Holder

A time and operation cost-saving tool holder of the turret type has been developed by The Presto Mfg. Co., 120 N. Newport Ave., Detroit, Mich.



### "ALIVE" Ball Bearing Centers



"They turn with the work"

Write TODAY — and let us tell you more about them.

**MODERN MACHINE CORP.**  
323 Berry St., Brooklyn, N. Y.



### Tapping As Fast As You Can Drill . . .

with the A. M. Sensitive Tapping Machine . . . from the smallest and finest up to  $\frac{3}{16}$ " diameter in steel and iron—and up to  $\frac{1}{4}$ " in softer materials. A modern unit that within its capacity, will take all the punishment intense production can inflict.



Write TODAY for  
this sure solution of  
your small  
tapping  
problems.

**A. Muchimatt Div.,**

**THE HAMILTON TOOL CO.**  
**HAMILTON,** OHIO

Although similar in general construction to the conventional type of tool holder, there is an important difference—the Presto has a turret head in which four  $\frac{3}{8}$ -inch tool bits may be mounted and individually adjusted for the proper height.

Indexing is said to be precise and accurate. All that's involved is loosening the nut on back of tool holder and turning turret clockwise or toward the operator until the required tool snaps into the lock, and thus into position for use. Then the nut is tightened again which automatically brings the turret tight against the lock.

The Presto is compact in size, easy to set up, rigid and accurate and should prove a real time saver on 3 or 4-jaw chucks, centers or face plate work.

Address the makers on your letter-head for further information, and please mention the BLUE BOOK.

# "SAFETY" SOCKET SCREWS

We make a complete line of Safety Socket Screws—of the finest workmanship and materials—conforming in every way with the most precise standards of quality.

We also manufacture Milled Studs and carry a stock of standard sizes. Prompt service on special designs.

Special Safety Socket Screws made to your specifications of any material required—brass, bronze, monel metal, stainless steel etc.

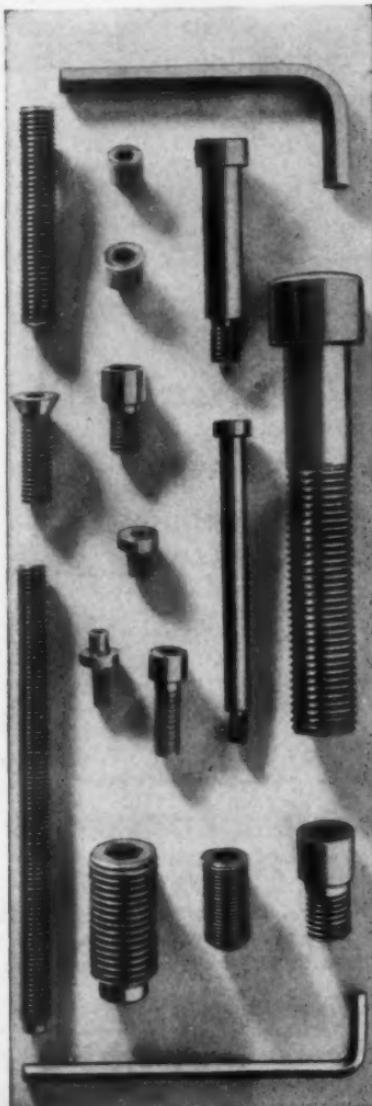
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## Marshalltown Offers Handy Punch Press Calculator

A handy calculator of the slide rule type is offered by the Marshalltown Mfg. Co., Marshalltown, Iowa. The device provides quick and accurate answers to the problems which confront punch press users and die designers periodically. For example, the pres-

sure required for blanking a piece 2-inches square from .025 carbon steel of 18-gage thickness. A table on the calculator gives symbols for the materials commonly used. Locating this symbol in the upper opening, it is set opposite "8" on the top scale (8-inches is the cutting edge of a piece 2-inches square). In a lower opening, showing pressures in tons for different thicknesses, the calculator shows that approximately 10 tons will be needed for 18-gage stock.

The calculator is  $8\frac{1}{4} \times 3\frac{1}{2}$ -inches, printed in two colors on tough substantial stock, and will be sent free if you write for it on your business letterhead and mention The BLUE BOOK.

### Weldon Tools

A new folder "N.T." issued by The Weldon Tool Co., 321 Frankfort Ave., Cleveland, Ohio, presents 8-pages of Weldon cutting tools including various end mills, die sinking cutters, T-slot cutters, cut-off blades, etc.

### Tantalum Carbide

Vascoloy-Ramet Corp., North Chicago, Ill., announce a new 12-page catalog and price list of standard tantalum carbide tools and blanks, describing the 10 V-R grades.

## You Save Money with Dial Indicators by Saving...

**Wasted Material**  
**Assembly Time**  
**Inferior**  
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*and you obtain...*

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6. ALL BEARINGS BRONZE BUSHED; BACKSHAFT OPERATES IN ANTI-FRICTION BEARINGS.

Through the use of VERSON PRESSES die life is increased and maintenance costs are reduced. They are available in capacities up to 5000 tons and are built by the ORIGINATORS OF ALL STEEL WELDED CONSTRUCTION IN THE MANUFACTURE OF PUNCH PRESSES.

Send for a copy of our NEW PRESS BULLETIN.

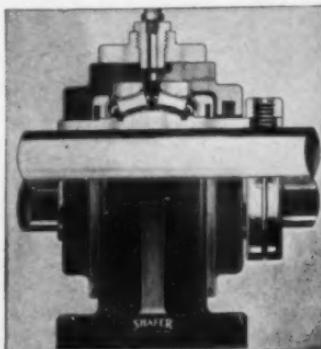
**VERSON ALLSTEEL PRESS CO.**  
**9303 So. Kenwood,** **CHICAGO, ILL.**

## Shafer Super Sealed Pillow Blocks

Shafer Bearing Corp., 35 East Wacker Drive, Chicago, has developed a new line of pillow blocks for heavy duty, embodying welded steel housing construction and super seal protection against unusually severe dirt conditions. Electrically welded steel construction provides a rugged housing of compact dimensions with bearings of ample capacity for severe service. The double row self-aligning roller bearing is mounted in a substantial cartridge housing containing the sealing members. This cartridge is then mounted in the welded steel frame. Bases are machined, and of 4 bolt type.

The super sealed construction consists of three sealing members. An outer felt of special self-aligning type is free to float in the cover groove, and is always in uniform contact with the inner race of the bearing under any conditions of misalignment. Inner seal plates are mounted between covers and bearing, forming a bearing lubri-

cant chamber. Washers are pressed on the inner race, and together with the inner seal plates form modified labyrinth seals. The large recesses formed by the inner seal plates and covers prevent contamination of lubricant within the bearing chamber.



The Shafer concave-roller bearing design provides inherent self-alignment, capacity for radial, or thrust, or combined radial-thrust loads in any combination. The double row bearings used in the super sealed pillow blocks have extended inner races. The drive collar is provided with two slotted socket head set screws and a spring lock wire, insuring positive locking even under severe vibration or shock loads.

Complete listings of dimensions and load ratings for super sealed pillow blocks in shaft sizes from  $1\frac{1}{8}$ -inch to  $3\frac{1}{8}$ -inch are given in Shafer Bulletin 521.

## Sanding and Polishing Machines



**Portable  
Electric  
Disc and  
Oscillating  
Types.**

*Write for  
circular.*

**THE NEDCO COMPANY**  
87 Rumford Ave., Waltham, Mass.



## NO MORE Injured Knuckles . . . Damaged Chucks ! Marring of Finished Work . . .

No need to pry, jerk or force work from magnetic chucks with NEU-T-ROL. Use any desired degree of magnetization—or full voltage to increase holding power—yet NEU-T-ROL releases work completely and demagnetizes it. Replaces present switch—reasonable in price—easy to install—a model for every chuck. Write for detailed information. Dealers' inquiries invited.

**ELECTRO-MATIC PRODUCTS CO.**  
**4820 Deming Place,** Chicago, Illinois



*for  
your  
lathes* **SENECA FALLS**  
*Automatic*  
**WORK DRIVER**

Self Centering . . . Quick Acting . . . No Slip. Attaches to any chuck plate or spindle. Provides a slip-proof, balanced drive reducing chatter. Handles rough forgings or turned pieces—straight or taper. Eliminates dogging time. Reduces tool breakage. Write for details and size range.

SENECA FALLS MACHINE CO., 314 Falls St., Seneca Falls, N. Y.



with  
Breuer's Ball Bearing

**T O R N A D O**  
PORTABLE INDUSTRIAL VACUUM CLEANER

**THE MOST POWERFUL VACUUM CLEANER  
FOR ITS SIZE EVER BUILT!**

**46½" Waterlift! 1 H. P. G. E. Ball  
Bearing Motor—Weighs Only 40 lbs.**

The TORNADO is an extremely portable Vacuum Cleaner that has gigantic power built into small space. It will pick up everything, including water. Gets into places ordinary cleaning methods never reach. Cleans walls, floors, piping, shafting, machinery, stock bins, boiler tubes, motors, etc. Proper tools for each plant application available.

Eliminates the expense of stationary plants or semi-portable cleaners—does everything that big machines do, at a fraction of the cost.

The TORNADO will pay for itself in any one department, but you use it throughout the plant—from boiler room to penthouse.

Send Quickmail Coupon No. 30 for literature which gives money-saving facts on cleaning and maintenance that you will be glad to know. No obligation.



**BREUER ELECTRIC MFG. CO.**  
**5108 N. RAVENSWOOD AVE., CHICAGO**

# CANEDY-OTTO



**PRECISION  
BUILT  
DRILLING  
UNITS**

**Ready for  
the Job**

These modern units assure the highest degree of accuracy and speed where large production is required. Each spindle has individual motor drive and may be operated at any required speed, and stopped without interfering with other spindles. All spindles are equipped with annular ball bearings and motor brackets are also ball bearing mounted. The C-O sliding motor mounting facilitates belt and speed adjustment and delivers full power to the spindle, permitting the use of smaller motors for corresponding service, giving more efficient performance.

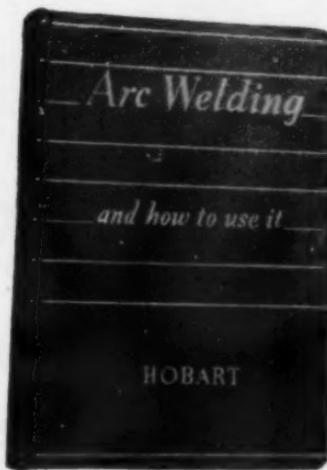
Complete stocks are carried at C-O Branches—  
407 Broome St., New York  
955 Folsom St., San Francisco, Cal.

*Write today for a full description of  
the many C-O advanced features.*

**CANEDY-OTTO MFG. CO.  
CHICAGO HEIGHTS, ILL.**

## Hobart Announces New Edition of Welding Handbook

New developments in arc welding, rods, machines and technique, make this 340-page manual issued by Hobart Brothers Co., Hobart Square, Troy, O., a helpful part of every welder's library.

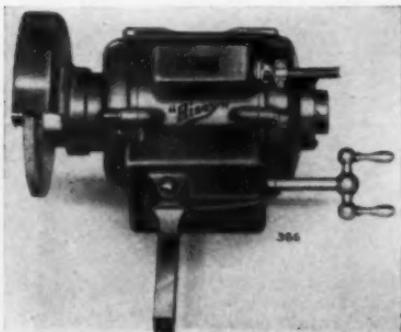


Divided into six logically arranged sections, the following subjects are discussed plainly and intelligently; general information on the development of arc welding, weldability of metals, applications or uses, various types of joints and welds, welding rods, welding speeds and costs; a series of practical welding lessons; information on carbon arc welding and cutting plus instruction for welding of non-ferrous metals; special information particularly interesting to engineers, designers, supervisors, etc. with a discussion of standard steel shapes, welding symbols, sheet steel and wire gauges, physical properties of elements and metals, weights of alloys and other special data; modern welding equipment briefly described and discussed.

"Arc Welding and How to Use It" is priced at \$1.50 per copy in the U. S. and \$2.00 in Canada and foreign countries.

## Hisey Electric Tool Post Grinders

Designed for attachment to the tool post of a lathe, vise or a milling machine, or head of a shaper, planer or

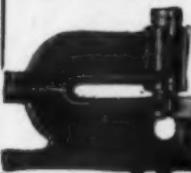


364

boring mill, a line of new grinding units is announced by The Hisey-Wolf Machine Co., Cincinnati, O. Among

the new features are precision ball bearings throughout, mounted in accordance with best engineering practice; commutator type repulsion induction motors for single phase service; double locknuts throughout permitting operation in either direction with safety; heavier spindles; larger wheel arbors; square thread feed screw and external cable connector. The units are made in  $\frac{1}{4}$  and  $\frac{1}{2}$ -h.p., sizes with horizontal slide adjustment as shown, also without slide feature.

## PERFORATING DIES



WALES individual, sub-press type units for press or press brake. Capacities up to  $\frac{3}{8}$  in. in 14 gauge — also square and Vee notching dies.

*Write for Bulletin A*

THE STIRRIT CORPORATION  
1559 Niagara St.,

Buffalo, N. Y.

## MODERN DIE-MAKING MACHINES



Model NS 14

YOU'LL BE  
INTERESTED  
IN THIS IMPROVED  
**G R O B**  
METAL BAND SAW

Improved in efficiency and performance . . . scientifically designed saw guides assuring faster cutting and longer life to the saw blade, four way tilt table, five speeds, automatic table feed with oil dash pot, etc. . . . Write for detailed catalog giving full information on above as well as on continuous motion filing machines and Open End Band Saws.



NS 14 shown with doors open

**G R O B   B R O T H E R S**  
GRAFTON, WISCONSIN

**BAUMBACH**

**STANDARDIZED DIE SETS**

Machined Steel      Semi-Steel  
Drop Forged Steel

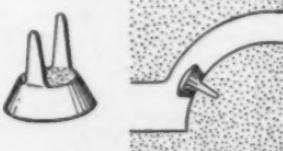
Headquarters for Standardized Die Sets, embodying many exclusive features and embracing more than 185,000 stock sizes and 46 different styles. A die service that is unsurpassed. Let us prove it!

Write for our new 288 Page Catalog.

**E. A. BAUMBACH MFG. CO.**  
1810 So. Kilbourne Ave., CHICAGO, ILL.

## Smith & Richardson Babbitt Anchors

Production of round or rectangular undercut anchoring holes in cast bearing parts is the purpose of the chaplets offered by Smith & Richardson Mfg. Co., 2 Illinois St., Geneva, Ill.



The illustration shows one of the round units in position in a mold, prior to pouring, indicating how the prongs anchor the chaplet in the sand.

Round chaplets are available in three sizes, from  $\frac{5}{8}$  to  $\frac{3}{4}$ -in. The rectangular unit measures  $\frac{1}{2} \times 1\frac{1}{4} \times \frac{1}{8}$ -in. Each unit is made of tin and the main cavity is filled with sand. This sand knocks out and the prongs break off when the casting is cleaned.

## Thor Balancer For Suspending Large Tools

A new device for suspending large electric and pneumatic drills, nut setters and other tools above the working location is announced by the Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago.

Known as the Thor Torque-Arm Balancer, this equipment supports the tool and also absorbs the torque, eliminating danger of injury to operators when the tool "sticks". Ease of handling and positive load control are obtained because the balancers are adjusted to balance in working position . . . no effort is required to lift or hold the tool or "fight" the torque.

Balancers are made with a range of travel from 3 feet to 6 feet and a load capacity of from 45 to 100 pounds. Weight complete is 143 pounds.

The Torque Arm telescopes to allow maximum amount of travel when open and minimum head room when closed. It is attached at the top to the load frame in a rocking bracket that

**LITTELL** Air-Blast Valve for Faster Safer Production

PAYS its cost in a few weeks time in — increased production — greater safety — economy of air. Automatically ejects pieces. Operator's hands are never in danger zone. Quickly adjustable air nozzle.

**Automatic Roll Feeds—**  
dial feeds, magazine feeds, hopper feeds, for punch presses. Reels for coiled stock. Send for Circulars.

**F. J. Littell Machine Co.**  
4153 RAVENSWOOD AVE., CHICAGO, ILL.

permits the tool to be swung backward or forward to either side. A yoke bracket at the bottom of the Torque Arm accommodates all shapes and sizes of yokes which can be furnished to attach to tools in any convenient manner.

The telescoping tube is square so that tools may be suspended either vertically or horizontally. A limit stop is provided which acts as a double safety device.

Adjustment is made to balance at working level. When not in use the device is raised to top position, where it locks automatically. When the tool is wanted at suspended working position again the balancer is released by a lift and jerk to start the load downward.

Complete details and specifications can be obtained from the makers by writing for Bulletin P19 and mentioning The BLUE BOOK.

# BALDOR BALL BEARING GRINDERS

## Smooth, Vibrationless Operation

Precision-built by Motor Specialists; Motors are Ball-bearing and Armatures are dynamically balanced. Wheels are equipped with BALDOR Balancing Flanges (patent pending)—an exclusive feature that doubly assures SMOOTH, VIBRATIONLESS OPERATION.



**Powerful  $\frac{1}{2}$  H. P. motor; 7" wheels**

No. 704 Single Phase .....	\$40.00
No. 705 Three Phase .....	40.00

Write for BULLETIN on Complete Line, 1/6 h. p. to 3 h. p.

**BALDOR ELECTRIC CO.**  
4368 Duncan Ave., St. Louis, Mo.

**BALDOR GRINDERS**  
*are built by Motor Specialists*

**MAIL  
COUPON  
No. 18**

## Buffalo Forge No. 18 Drills

In presenting the new No. 18 line of Buffalo drills, the makers frankly explain that these serviceable looking, efficient performing tools are not dolled-up with special plating and enamel. Instead of sales appeal gadgets, your purchase price buys a chrome-nickel alloy spindle—9375-in. in diameter, capable of drilling one-inch in cast iron—a large, heavy column and large, accurate working surfaces. Spindle bearings and spindle sleeve bearing are fully adjustable to extend the accurate-performing life of the drill.

Eighteen models are available to meet almost any preference in the arrangement of table, feed, etc. Model 18-A offers a production type oil groove table, head-raising device, foot feed and table raising screw. Running down through the alphabet with a different letters designating variations in features and equipment, No. 18-L is the standard table model, while 18-S stands for the 6-spindle production

base, bench type, with head raising device.

Head frames are heavy and substantial, and are split in front with adjustment for wear of the spindle sleeve bearing.



### NEW ROTARY TABLE



New Design.

High Grade.

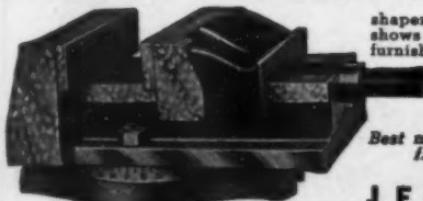
Low Priced.

For Millers, Slotters, Die Sinkers, Shapers and Drilling Machines.

Dealers—write for attractive proposition and new printed matter, just off the press.

**ALFRED A. TROYKE**  
221 E. Second St. Cincinnati, Ohio

## PLUNKET IMPROVED VISES



We make a complete line of modern vises for drill presses, shapers, milling machines and grinders. Illustration shows our standard milling machine vise as regularly furnished and stocked.

In ordering this vise give size of slot in table:

No. 1—6" jaws, 11/4" deep, opens 5" wt. 45 lbs. \$34.50

No. 2—10" jaws, 2 1/4" deep, opens 8 1/2" wt. 120 lbs. \$6.80

Best material and workmanship. Prices are net f. o. b. Chicago. Dealers' inquiries are solicited. Write for folder TODAY.

**J. E. Plunket Machine Co.,** 1123 W. LAKE ST., CHICAGO, ILL.

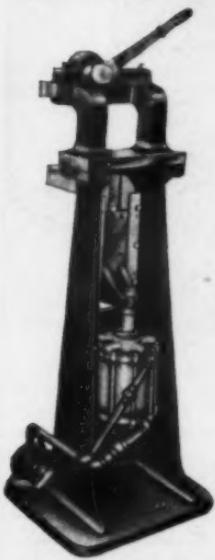
of large drills. Bearings are sealed to exclude dust and retain lubricant. Spindle sleeve has the rack cut integral and slides in an exceptionally long bearing in head. Precision type ball bearings mount the spindle pulley, fitted above and below the pulley so that no driving torque is transmitted directly to the spindle.

Table raising screw is full ball bearing, actuated by machine-cut steel screw and machine-cut steel gears. The raising crank is pivoted in its shaft

and can be turned with the handle toward the inside to protect it from being bumped and broken. Three ball thrust bearings make for easy operation. Table fork is provided with an eccentric safety latch which prevents table from dropping when raising screw is not used.

Address the Buffalo Forge Co., 161 Mortimer St., Buffalo, N. Y., for copy of 12-page bulletin No. 3123, illustrating the different models and presenting complete information.

## SCHMIDT "Hi-Duty" Pneumatic MARKING MACHINE



MODEL 25  
(Side view shows  
air cylinder)

ADVANCED BUSINESS METHODS demand improved records of metal fabrications. This machine makes marking operations quick and simple. Part numbers—order numbers—manufacturer's name and other important data marked on your products will mean permanent records, to last the life of the part, and REPEAT ORDERS, a vital part of any business.

The Schmidt Model 25, illustrated at left, is a light, general purpose hand marking machine, with a supplementary air cylinder to take the place of the foot pedal in raising the work to the lettering tool. Air from the shop line is used, and the four-way foot valve assures fast operation. This machine uses solid flat or round dies as well as the adjustable type, in a flat or knuri type holder. The use of the air cylinder, by reducing operator fatigue, greatly increases production on continuous marking operations.

### SPECIFICATIONS

Will mark flats or irregular surfaces up to 4" thick.	
Will mark rounds up to 10" diameter, or bars up to 4" diameter.	
Carriage or Die Stroke.....	2½"
Throat—Center of die to front of uprights.....	3"
Roller Bearing Die Slide.	
Table Rise—Low to High Position.....	6"
Table Rise by Air Cylinder.....	½" - 1"
Table Pressure 2400 lb. at 75 lb. line pressure.	
Table Dimensions 5½" x 9¾" with 2" x 4" slot.	
Operates on line pressure of 30 lb. to 100 lb.	

## GEO. T. SCHMIDT, Inc.

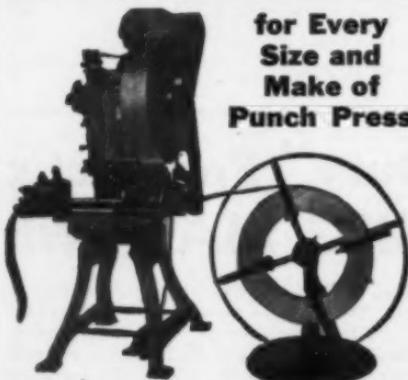
1802 Belle Plaine Ave., Chicago, Ill.

Builders of Marking Equipment Since 1895.

Send Quickmail Coupon No. 40 for complete catalog of our full line of Marking Tools, Machinery and Equipment.

# WITTEK AUTOMATIC ROLL FEEDS

for Every  
Size and  
Make of  
Punch Press



## FAST — ACCURATE ! SAFE — AUTOMATIC !

WITTEK Roll Feeds will protect you and your operators. Presses are kept operating up to capacity—feeding any stock from coils in lengths up to 24" per press stroke—saving in time, dies and production costs. Single roll, double roll and compound types with straightener—fits any press without alterations.



WITTEK Reel Stands  
— 6 models — enable  
one man to center  
heavy coils. Ball bearing  
mounted—adjustable  
to any height—  
balanced at any angle  
—500-lbs. capacity.

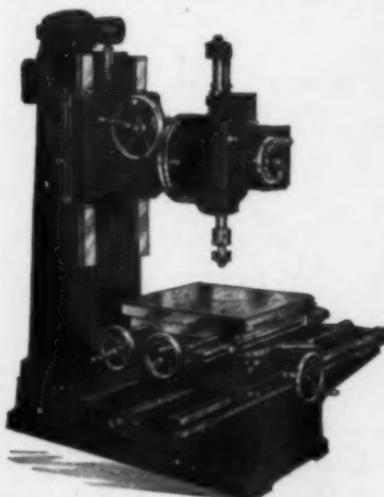
*Send for Bulletin "HF"  
giving complete details.*

A size for every  
requirement.

WITTEK MANUFACTURING CO.  
4305-9 W. 24th Place. Chicago, Ill.

## Oliver No. 103 Pattern Miller

Pattern shops and pattern makers should be interested in the new No. 103 Miller announced by Oliver Machinery Co., Grand Rapids, Mich. Smaller than the No. 102, the new unit sells at a lower price which should extend its sales appeal.



Suitable for use in wood or soft metals, the makers assert that the machine should prove as useful in pattern shops as universal milling machines are in tool rooms. Almost every conceivable operation in pattern making can be handled on the No. 103, eliminating much delicate and slow hand work. Bits are provided for most operations and tools for special work can be made readily. Adjustments are possible in any direction and to any position without removing work from the table.

The drive is designed for a 2 or 3-phase 60-cycle, 220/440 volt a.c. motor, but a d.c. drive can be supplied on order.

A  $\frac{3}{4}$ -h.p., geared motor on top of column operates a screw to raise or lower the arm. The latter carries the

head and 2-speed motor driving the spindle. Changing position of the V-belts, four spindle speeds are available—4000, 2900, 2000 and 1450 r.p.m.

The 1½-inch alloy steel spindle runs in precision ball bearings and is provided with an enlarged head for No. 4 Morse taper or any of the cutters used on the No. 102.

Head is of the offset type so that core boxes 7-inches and larger may be cut with spindle horizontal. Center of spindle to face of column is 30-inches.

Extreme height in vertical position of spindle from top of table is 20-inches, or with spindle horizontal 22-inches. Main slide is rigidly bolted to floor plate and is 66x19-inches. It permits a 54-inch table movement.

Full mechanical details and specifications are given in a new 12-page bulletin, along with data on tool equipment and typical examples of work performed. In writing the makers for your copy kindly mention The BLUE BOOK.

A CLEAN BLOW  
WITHOUT INJURY  
TO SURFACE STRUCK

USE THE  
**BASA**  
HAMMER  
WITH REMOVABLE FACES

MADE IN FIVE SIZES

In finishing and assembly work it is often desirable to use a hammer that can strike more than one kind of blow.

Send Quickmail Coupon No. 35  
for full particulars

FASTER AND MORE  
SATISFACTORY WORK  
MADE POSSIBLE

Rawhide, Copper and Babbitt faces can be inserted in head by simply loosening nut.

Faces cannot rattle in head, or fall out—The clamping jaws of the "BASA" hammer can be set up to take care of shrinkage or wear of the faces.

**GREENE, TWEED & CO.**  
SOLE MANUFACTURERS  
109 Duane St., New York, N. Y.

## "Oman" Self-Lubricating Bearing Metal

Woodworkers' Tool Works, 220 So. Jefferson St., Chicago, announce "Oman"—a new, self-lubricating bearing metal for bushings, bearings, slides, elevator gibs, motor bearings, high speed grinder bearings and bearings subjected to high temperatures.

Technically described as a solidified emulsion of lead in copper, "Oman" metal is said to be a copper matte having its interstices filled with amorphous virgin lead. The lead is therefore available to the fullest extent as a lubricant and the copper serves as a heat conductor and supporting medium.

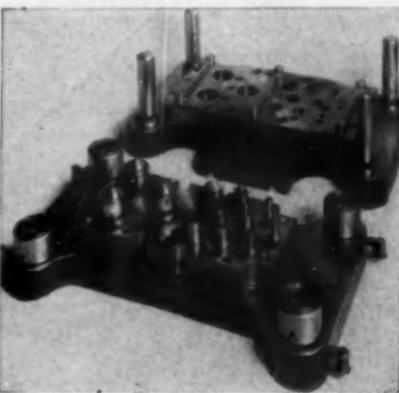
It is asserted that "Oman" metal cannot score or in any manner damage a steel shaft or journal even though heavily overloaded. Further that lubricant cannot be expelled from the load side while the shaft is at rest.

"Oman" Metal is said to machine more freely than average screw stock and to yield readily to milling, turning, boring, reaming, drilling and burnish-

ing operations. No cutting lubrication is needed as the inherent characteristics of the metal serve this purpose. A descriptive circular and full information will be sent on request.

## An Unusual Progressive Die

Interchangeability usually is not a feature of progressive dies. The die illustrated, however, has completely interchangeable punches and buttons. It was built by the Northeastern Engineering Co., Detroit, for the interchangeable manufacture of any size of paper washers up to 1 3/4-inch diameter. Retainer plates were designed by Hovis Screwlock Co., Detroit, using the screwlock principle which securely locks punches and dies but permits easy removal.



**IT'S EASY** to place the die in the press with a

### HAMILTON "Portelvator" (Portable Elevating Table)

Eliminates drudgery — cuts production costs.

Send for descriptive folder.



The Hamilton Tool Co.,

Hamilton, O.

In a die such as shown, punch clearance may be only .00025-in., on a side which involves precision workmanship in the making of retainer plates, punches and button dies. The screwlock principle of retaining is particularly adaptable for such dies, as there is no tendency to crowd the punch to one side in the piercing or stripping cycles.

In operation this die produces two nesting paper washers of .004-in. thickness in each run. The three punches of each size produce six complete washers at each stroke of the press for each layer of paper stock used. Thus

with four thicknesses of paper, 24 washers are produced with each press stroke.

Static electricity is generated in the handling of paper at high speeds and this required special precautions in designing and making the transferring and lifting mechanisms.

All guide pins were lapped to assure accurate operation. Guide pin bushings in this die are blind and equipped with felt washers and lubricators to prevent dust and grit from destroying

the fit of guide pins and impairing die alignment.

It is claimed that the screwlock principle not only permits great accuracy in die construction, but also is so basically strong as to make the use of progressive dies possible for producing parts from steel as thick as 3/32-in. Records of actual operation for more than two years, and the production of as many as 12,000,000 pieces without failure are offered in substantiation.



## STANDARDIZED JIG BUSHINGS

Prompt delivery from stock on over 10,900 standard items—over 6700 ACME Standard—over 4200 A. S. A. Standard—all completely finished ready for use. *Special sizes made to order.*

Made in our new plant by the most exacting and scientific methods—insuring accurate fit plus long wear—concentric within .0003" full indicator reading.

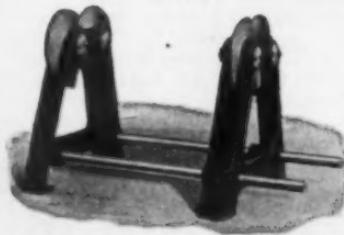
Send Quickmail Coupon No. 39  
for bulletin containing complete data and low prices. Satisfactory service guaranteed.

Also manufacturers of complete machine parts, specializing in hardened and ground parts requiring extremely close limits, lapped fits, etc. also hydraulic appliances for pressures up to 20,000 lb. per square inch.

**ACME Industrial Co.**  
210 N. LAFLIN ST., • CHICAGO, ILL.

# ANDERSON

## Improved Balancing Ways



Equip your shop with this accepted method of balancing rotating parts—checking, straightening and truing operations.

**Anderson Improved Balancing Ways** are simple, sturdy and dependable. They save time, effort and trouble—assure better work.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a prompt, sure indication of whether or not the work is in perfect balance.

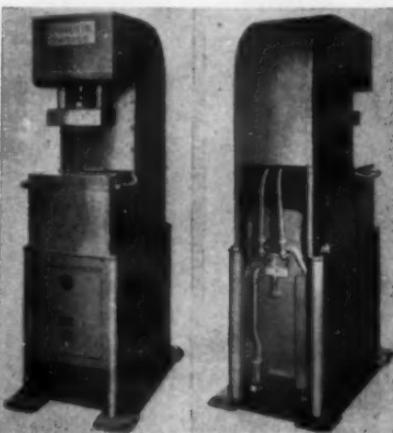
Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

*Let us tell you more about this and other useful Anderson equipment. Your request will bring full details promptly.*

**Anderson Bros. Mfg. Co.**  
1907 Kishwaukee Street,  
**ROCKFORD, ILLINOIS**

## Hannifin "Hy-Power" Hydraulic Press

This high speed, semi-automatic Hannifin hydraulic press is a compact, self-contained unit adaptable to a variety of operations, such as pressing, forming, crimping, stamping, shallow drawing, etc. It has a capacity of 12½-tonnes, and the complete operating cycle is approximately 2-seconds. "Hy-power" hydraulic operation provides an automatically completed press cycle under push button control. This includes:—rapid advance stroke until die touches work; automatic high pressure working stroke; automatic reversal at maximum pressure; rapid return to starting position. The oil pump idles at zero pressure between cycles.



The hydraulic pressure generator is driven by a 2-h.p. motor, located in the base. Pressure generator unit is mounted on casters and may be removed by disconnecting two pipes. Only electrical connections are required for installation of the press.

Operation is controlled by two push buttons at sides of table. Both buttons must be held down to operate the press which insures that operator's hands are clear. This causes the ram to operate through one cycle. Instant safety stop is provided. Releasing

either control button at any point in the cycle stops the ram and returns it to top position. Push buttons must be released and pressed again for another cycle of operation.

The "hy-power" operation automatically provides the high pressure working stroke and reversal of the ram, controlled by pressures needed during the ram stroke. This feature removes the necessity for close vertical die adjustment, and with the smooth hydraulic action results in

longer die life. Pressure during working stroke, and maximum pressure at point of reversal may be adjusted.

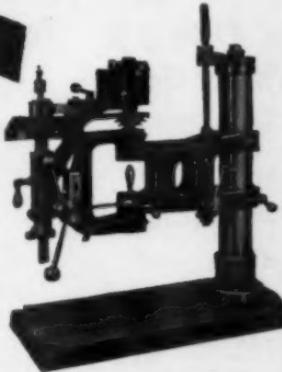
Similar presses are available in capacities up to 60-tons. Some specifications for the model shown are:—stroke 3-in.; table to platen (up) 9-in.; center of ram to face of frame 7-in.; platen (guided) 6 x 10-in.; table 10 x 15-in.; base 22½ x 34½.

For further information please write Hannifin Mfg. Co., 621 So. Kolmar Ave., Chicago.

*A Time Saver In Any Shop*

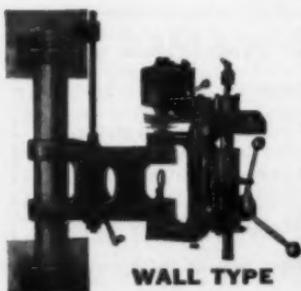
## AYER SENSITIVE BENCH RADIAL DRILL

A rugged, modern, ball bearing sensitive drill, with all the advanced features found in high class tools of this kind.



Sensitive balance of spindle at all speeds is provided by long extension spring within drill frame. Depth gauge and graduated sleeve are provided.

Drill capacity  $\frac{1}{2}$ "; minimum distance spindle to column 6"; maximum distance  $3\frac{1}{2}$ "; minimum distance spindle nose to base 4"; maximum distance 21"; spindle travel 5"; spindle bore Morse No. 2; high grade geared  $\frac{1}{2}$ " chuck furnished in place of Morse Taper if preferred.



WALL TYPE

Furnished in either bench or wall types. Spindle can be equipped with tapper or motor equipped with reverse switch. Motor bracket is located for larger or different make motors.

Quickmail Coupon No. 17 will bring you full information and low prices.

Choice territory open to progressive dealers.

**F. H. AYER MFG. CO.,  
CHICAGO HEIGHTS, ILLINOIS**

## Milwaukee Electric 3-Speed Sander

A new 3-speed 9-inch heavy-duty portable electric tool is offered by the Milwaukee Electric Tool Corp., 120 North Water St., Milwaukee, Wis. Actually 3 machines in one, it is a 2-speed sander, a feather-edger and a polisher. A simplified form of gear shift requires only the moving of a lever on the side of the machine to change the speeds. Low speed with

the curved-faced flexible steel backing pad is used for feather-edging the paint with a special sandpaper disc and for polishing with a lambswool pad. The



**ASK FOR THE GENUINE**

## COMET Vernier Caliper

**\$5.50**

with genuine leather pocket case.

**WHY PAY MORE?**

**Send for one  
today!**

**Shop agents,  
dealers  
wanted.**



**Measures to .001" Outside,  
Inside and Depth**

Measuring range 5-5/16"

Total length 8".

Scales: 1/16" with vernier  
1/128".  
.025" with vernier 1/1000"

Decimal equivalents on re-  
verse side of gage.

Glass-hard jaws.

Fine workmanship.  
A precision tool at a reasonable price.

**COMET TOOLS, Inc.**  
39 Union Square, New York, N.Y.

intermediate speed is used with the 9-inch flat nested spring steel backing pad for grinding off high spots and for metal surfacing. The high speed is used with the 7-inch flat nested spring steel backing pad when the abrasive disc is trimmed from 9-inch to 7-inch diameter. With this tool it should be possible to do the whole job of removing paint, sanding, feather-edging and polishing at the correct speed.



## YOU'LL MAKE NO MISTAKE . . .

in trying this modern medium for scribing layouts. Easier to see—easier to follow accurately because the scribed lines have a pronounced contrast against the dark background. Excellent for wet machining operations. Send 40c for 5-oz. special brush-in-can sample for shop use.

**Quart Containers 90c**

**Gallon Containers \$2.50**

**MICHIGAN CHROME CO., 6340 E. Jefferson Ave., Detroit, Mich.**

**SUPREME  
Lay-out DYE**

## Improved Immersion Pyrometer

Heretofore, pyrometers for non-ferrous foundries were available with either bare metal thermo-couples or with the so-called "protected type" of thermo-couples. Both of these types have advantages under certain operating conditions.

The Pyrometer Instrument Co., 102 Lafayette St., New York, is now prepared to furnish their various types (straight or flexible) of Pyro immersion pyrometers for non-ferrous metals with interchangeable thermo-couples of various lengths, either of the bare or protected type, both being quickly interchangeable.



The makers emphasize the sturdiness and ruggedness of the instrument itself. The new type handle is convenient. A correction screw on the face of the instrument makes it possible to maintain perfect calibration at all times. A patented clamping device is embodied in the indicator. This fixes the indicating needle at the correct temperature indication, which may be read and checked after withdrawal. A second pressure on the red button on the housing returns the needle to its zero setting. This locking device also protects the instrument from damage while being carried or in transit.

A new illustrated catalog, No. 110, will be forwarded on request.

# UP - UP - UP

Goes NATION-WIDE  
PREFERENCE



for PUTNAM  
Hi-Speed  
END MILLS

Four years ago a line of end mills was introduced by a new manufacturer in the cutting tool field. Today those end mills are the first choice of thousands of production men in every section of the country.

Practical design . . . the finest quality high-speed steel . . . expert and precise workmanship . . . heat-treating by the ultra-modern salt bath process . . . an unconditional performance guarantee . . . have all contributed to this sensational acceptance of Putnam Hi-Speed End Mills. The most convincing argument in their favor, however, has been in results, experienced in the first trial and succeeding production tests, that have prompted manufacturers to continue to use Putnam End Mills exclusively. Those same results will sell you—and KEEP you sold—on the end mills that "CUT FASTER and LAST LONGER."

*Write for Complete Catalog.*

# PUTNAM TOOL COMPANY

2903 CHARLEVOIX AVE. • DETROIT, MICH.



**Price \$7.50**  
F.O.B. Chicago

netizers now on the market. Will last a lifetime. We invite comparison.

*Send check with order. We pay your freight.*

**Victor Machinery Company**  
130 So. Clinton St., Chicago, Ill.

### HANDMAG

#### Demagnetizer

#### AC Portable Type

A low priced, highly efficient unit guaranteed to duplicate the performance of larger demagnetizers now on the market. Will last a lifetime. We invite comparison.

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**Victor Machinery Company**  
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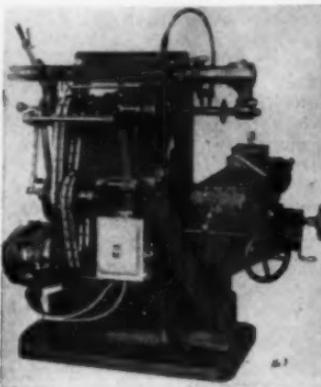
The vacation capital of America - and unusually fine hotel accommodations at the Shirley-Savoy - only a few minutes ride from all the glories of Colorado. Air-Conditioned Shirley Tavern and Coffee Shop. Convenient parking in the SHIRLEY GARAGE.

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**400 ROOMS FROM \$2**

**HOTEL**  
**SHIRLEY-SAVOY**  
BROADWAY AT SEVENTEENTH

## Powermaster Variable Speed Drive

An interesting variable speed drive for machine tools of all kinds is offered by Powermaster, 25 E. Fourth St., New York City.



An infinitely variable speed range is provided by a combination of chain V-belts and conical discs—the two outer discs being fixed and the movable double center discs. As one belt moves in toward the axis of the discs, the other belt is forced outward, with full traction being maintained constantly on both belts. One belt carries the power from the motor. The other belt drives the machine. Thus, movement of a shift handle affords an infinite range of speeds within the ratios of 6:1 and 8:1, with motors up

**"Buy Economy — You'll Effect Economy"**



**SOCKET HEAD  
CAP SCREWS**

*Milled  
from Bar*



**HOLLOW  
SET SCREWS**

*Made of  
Alloy Steel*



**ECONOMY MACHINE PRODUCTS CO.**  
5207 LAWRENCE AVE. CHICAGO, ILL.

to  $7\frac{1}{2}$ -h.p. Drives giving higher ratios of speed, and for larger motors can be furnished. Drives are furnished either with or without the self-contained clutch. Drives are easily attached with a four-bolt mounting. As belts are not shifted, they can be covered.

For complete information, please address the makers, and mention The BLUE BOOK.

### Barber - Colman Pinwedge Bulletin

A bright and colorful new 4-page broadside issued by Barber-Colman Co., Rockford, Ill., presents in numerous illustrations, the features and advantages of their new Pinwedge expandible reamer, originally designated as the Masterall, which name is being discontinued voluntarily by them. Details of this interesting new reamer were presented in the April BLUE BOOK. Copies of the broadside may be had by addressing the manufacturers.

### COMMERCIAL Centerless Grinding COMPANY

Contract Centerless Grinding  
Accuracy — Prompt Service

6538 Carnegie Ave.,

Cleveland, Ohio



**SAVE 80%**  
On Hack Saw Blades

Reground each  
blade 4 times.  
Price of \$15.75  
includes one  
grinding wheel.

**C. H. CARLSON MFG. CO.**  
13-15 Main St., N. E.      Minneapolis, Minn.

"First Aid" Kits of

### WALTON TAP EXTRACTORS

ARE A SHOP NECESSITY  
WHEREVER TAPS  
ARE USED



They remove  
taps broken at or be-  
low the surface of the  
hole easily, quickly  
and without injury  
to the threads.

Send for Folder 132  
giving sizes, styles  
and prices.

Test their worth by  
30-day Free Trial.

**The Walton Co.**  
95 ALLYN STREET  
HARTFORD, CONN.



### HAMILTON MILL CUT ROTARY FILES

BETTER . . . because of superior steel! . . . precision milled to a fine sharp edge. Teeth have a positive rake which insures a milling action—not an abrasive, frictional removal of metal. We solicit your inquiries on *special* as well as standard shapes and sizes. Try them and notice the difference.

**THE HAMILTON TOOL CO.**

**HAMILTON, OHIO**

## A Correction

Under the heading "A Modern Tool and Die Shop" an article was included in the July issue (page 100) which should have referred to the QUALITY Tool & Die Co., 401 N. Noble St., Indianapolis, Ind. In some way, the firm name was given as Economy Tool & Die Co. We tender our apologies to Blue Book readers and to Manager Ray W. Rice.

**ARMGLO CO.**  
*Manufacturers of*  
 Manual and Automatic Resistance  
**WELDING PRODUCTION EQUIPMENT**  
 with Magnetic Timing Control  
 also  
**DIE FILING & BELT SURFACING MACHINES**  
*Write for complete details*  
**ARMGLO CO.,** 3520 W. Pierce Street,  
 MILWAUKEE, WIS.

## Anderson Pillow Block Type of Balancing Ways

Anderson Bros. Mfg. Co., Rockford, Ill., announce an addition to their line of improved balancing ways — the pillow block type illustrated, for extra large diameter work.



The customer provides his own sub-base of suitable height to take care of his own particular work.



*Write today to*

## GROBET FILE CORP. OF AMERICA

3 Park Place,

New York City

## Ask for our Catalogs

Catalog RW illustrates a great many shapes and sizes of rotary files and rasps.

Catalog NW illustrates more than 4000 different precision Swiss files.



## Modernize Your // **POWERMASTER** //

Eliminate overhead countershaft drives.  
 Speed-up jobs with instant variable speed control.  
 Turn the power you consume into production.  
 Step-up quality of output—let operator really control machine.  
 Eliminate time-waste of belt shifting.

**UNCONDITIONALLY GUARANTEED—**

*Write for details and price*

**"POWERMASTER"** 25 East Fourth St.,  
 New York, N. Y.

The ways are equipped with the Anderson design of super-sensitive ball bearings and are built in 1000, 2000, 5000, 10,000 and 20,000 pounds capacities.

The discs are of chilled iron and ground to size. A sturdy cast iron base supports the bearings and discs.

### Simonds in New Ultra-Modern Plant

Simonds Saw & Steel Co., are moving into their new windowless plant at Fitchburg, Mass. The big new building will house the main Fitchburg saw and knife plant, the Fitchburg file and hacksaw plant and the Chicago plant in which band saws and crosscut saws are made. The complete 5-acre plant is air conditioned and lighting equipment is designed to maintain uniform illumination of 20-foot candles on the working plane. Products to be made will include industrial saws for all kinds for wood or metal, machine knives, files and hack saw blades.

### Atlas Shaper Catalog

In response to requests for additional information on the new Atlas shaper, catalog No. 30 has been prepared. Sixteen illustrations inside the cover show typical jobs performed. There are two large illustrations showing every detail of the machine, together with close-ups of the outstanding features and equipment details. Copies may be had by addressing the Atlas Press Co., Kalamazoo, Mich.

### BURR KEYSEATERS



Mill keyways in the run  
or on the ends of shafting  
already erected—save  
money on alteration,  
erection, and repair work.

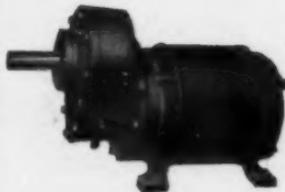
Made in 4 sizes, for hand  
or motor operation.

*Write for Bulletins and prices.*

**JOHN T. BURR & SON**  
429 Kent Ave., Brooklyn, N. Y.



# Janette



Types SG1, SG2 and SG4,  
single reduction, helical gear  
motorized speed reducers.

### Motorized Speed Reducers

#### 16 DIFFERENT STYLES

from which to select the exact type of  
speed reducer to meet your individual  
requirements.

1/30 to 7-1/2 H. P.

The diversity of the Janette custom built line  
of motorized speed reducers, enables us to  
supply a machine for almost any purpose.

*Ask For Bulletin 22-25D*

**ROTARY CONVERTERS — MOTOR GENERATORS — BLOWER WHEELS**

**Janette Manufacturing Company**  
556-558 West Monroe Street Chicago, Ill. U. S. A.

## POWER MOVEMENT IN ANY DIRECTION



HANNA Cylinders may be mounted vertically, horizontally or in any other position and deliver the same powerful, smooth, positive thrust or pull motion.

Select an operation in your plant involving a pushing, pulling, lifting or lowering motion and compare cost of doing it with a Hanna Cylinder.



### TO LEARN PRICE OF CYLINDER SPECIFY FOLLOWING:

1. Cylinder diameter or force required.
2. Length of stroke.
3. How cylinder is to be mounted.

Send Quickmail Coupon No. 24 for full information.

## PUSH—PULL—LIFT—with HANNA CYLINDERS

### HANNA ENGINEERING WORKS

1763 ELSTON AVENUE

CHICAGO, ILLINOIS

To your  
Issue of  
Business Book

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PUBLISHERS, INC.

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HITCHCOCK  
PUBLISHING CO.

To your  
Issue of  
Business Book

F. H. AYER

17

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9

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1

Stick coupon on your letterhead

<p>This refers to your ad in August issue of Hitchcock Blue Book</p> <p><b>1</b></p>	<p><b>HARDINGE BROTHERS, INC.</b> Elmira, N. Y.</p>	<p>August 1938</p>	<p><b>HITCHCOCK PUBLISHING CO.</b> 508 S. Dearborn St. Chicago, Ill.</p>	<p><b>F. H. AYER MFG. CO.</b> Chicago Heights, Ill.</p>
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BALDOR ELEC. CO.

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Stick coupon on letterhead or postcard and sign name, title and firm name for catalog on the complete Wyco line.

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ARMSTRONG BROS.  
TOOL CO.

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Stick coupon on letterhead or postcard and sign name, title and firm for fall information on Universal Vises.

ODIN UNIVERSAL CORP.

22

Stick coupon on your letterhead and sign your name, title and firm name for booklet describing Jarvis tappers.

CHARLES L. JARVIS CO.

23

Stick coupon on your letterhead and sign your name, title and firm name for bulletins on Conway clutches.

CONWAY CLUTCH CO.

24

Stick coupon on your letterhead and sign your name, title and firm name for catalog on Hanna cylinders.

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WORKS

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Stick coupon on your letterhead and sign your name and title to receive your copy of The Blue Book every month.

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BRIDGEPORT PATTERN  
& MODEL WORKS

3

Stick coupon on your letterhead and sign your name, title and firm name for information on Timesaver lapping compound.

TIMESAVER PRODUCTS CO.

4

Stick coupon on letterhead or postcard and sign name, title and firm for Handee Grinder on 10 day trial.

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Stick coupon on your letterhead and sign your name, title and firm name to receive your copy of the Renz catalog.

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Stick coupon on your letterhead and sign your name, title and firm name for bulletin on Cro-bait plug thread gages.

DETROIT TAP & TOOL CO.

7

Stick coupon on your letterhead and sign your name, title and firm name for information on Berkley motor drives.

BERKELEY ENGINEERING CO.

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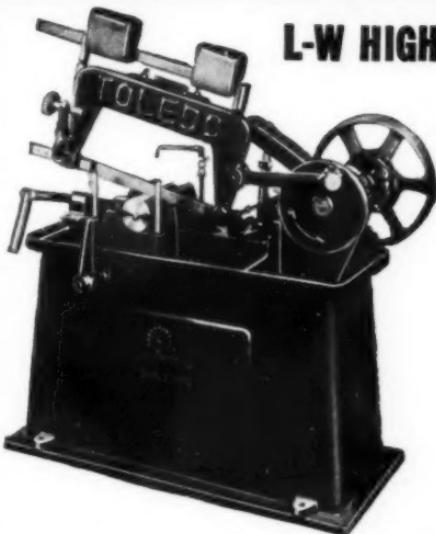
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SUNDSTRAND MACHINE  
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## L-W HIGH SPEED 6x6 POWER SAW

*A Real Saw That Will  
Save You Time  
And Money*

**\$160**

Motor Drive  
Arrangement  
\$22.50  
Additional

Designed for maximum rigidity, this saw is accurate and efficient in operation. Automatic trip stops the machine on completion of the cut. Automatic relief of the saw blade on the non-cutting stroke is also provided. To make a clean and compact assembly, the coolant pump is mounted inside the base. Capacity is 6" x 6" with 14" blade.

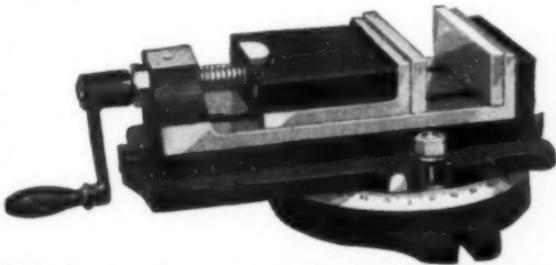


## 4-Jaw INDEPENDENT LATHE CHUCKS

L-W Lathe Chucks are built with semi-steel construction and heavily ribbed body to withstand unusual strains. Four independent jaws made of accurately ground and fitted hardened steel are reversible and have 1 1/4" tough nickel steel screws. Best material and workmanship guarantee satisfactory service.

Now Made in  
5 Sizes

10-inch	\$29.00
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14-inch	38.00
16-inch	47.00
18-inch	62.75



## SWIVEL MILLING MACHINE VISSES

Large, Semi-Steel, 85 lbs.  
Made in Two Sizes

This large semi-steel vise which can be used plain or swivel is suitable for milling machine, drill press or shaper. Has sturdy 6 1/2" steel jaws; key slots provide for attaching to machine table holding surface and jaws at right angles or parallel to table. Shipping weight 90 lbs.

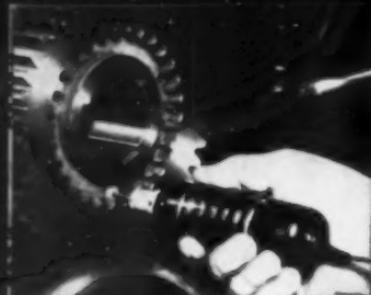
6 1/2" size ..... \$29.50  
4 1/2" size ..... 21.00

L-W also manufactures magnetic chucks, demagnetizers, and dividing heads. Send Quickmail Coupon No. 36 for a catalog of the complete L-W line.

# L-W CHUCK CO.

1-7 N. ST. CLAIR ST.,

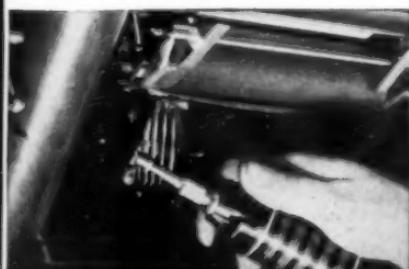
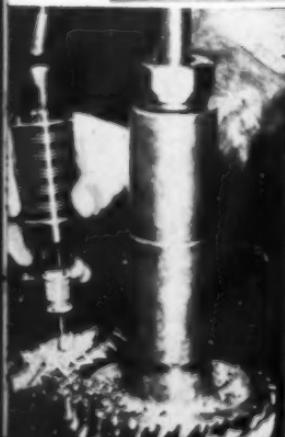
TOLEDO, OHIO



The DeLuxe Handee pays for itself many times over, often on one job.



Reaches those hard-to-get-at places. Its light weight and ease of handling in any position save time on a wide range of operations.



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## SATIN SMOOTH FAST AS LIGHTNING

- Since it was originated eight years ago, Handee tools have been put to work in more than 100,000 homes, repair shops, laboratories, and factories.
- Actually, a Whole Shop Full of Tools can be operated wherever there is electricity—some shafting, pulleys, etc. Operate it from any AC or DC outlet, 110 or 220 Volts.
- Uses 200 different accessories, all interchangeable in easy-working chuck.

<b>GRINDS</b>	<b>CUTS</b>	<b>SAWS</b>
<b>DRILLS</b>	<b>ROUTS</b>	<b>SCRAPES</b>
<b>POLISHES</b>	<b>CARVES</b>	<b>SHAPES</b>

- Does precision work on delicate instruments, repairs machine parts, dismantles machine, used on pipe, wire, sheet metal. Indispensable for work on glass, plastics, wood, stone, leather.

Try a Handee. You'll find it the fastest, most powerful tool for its size and weight, 12 ounces.

Order on 10-Days Credit  
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Manufactured by  
**1101 W. MONROE ST.**

**EE** **TOOL OF  
1001 USES**

# **SMOOTH and S LIGHTNING**

and eight years ago, thousands of Handees  
work in metal working shops, factories, tool  
laboratories, etc.

Shop Full of Tools in One, the Handee can  
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somes, etc. required. Just plug the Handee  
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Accessories, quickly interchange-  
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on delicate mechan-  
ical parts without dis-  
turbance on production lines.  
Work on all metals, alloys,  
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You'll find it the finest  
tool for its type and

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**GO WHEEL & MFG. CO.**

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Picture  
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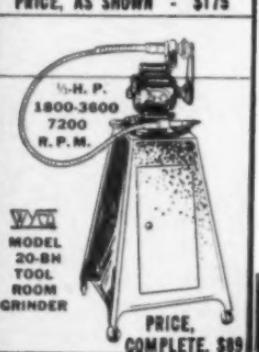
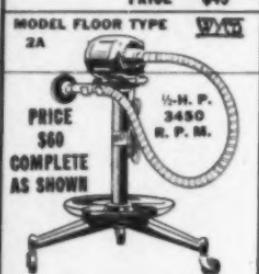
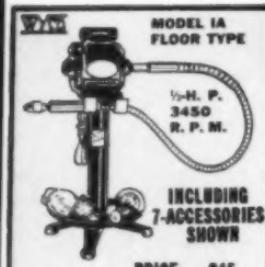
De Luxe  
Model

**\$185**

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For TRIAL OFFER  
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**WYCO Flexible Shaft Equipment**

## Compare Prices! We Guarantee Quality

Check WYCO Equipment against other comparable flexible shaft units.

You'll find your dollars buy more value in WYCO equipment.

1st—Because the mechanical design is correct for practical work.

2nd—Good workmanship and high quality of material assure trouble-free performance.

3rd—Priced to warrant a sure return on a minimum investment.

WYCO Flexible Shaft Machines are made in various styles and sizes from  $\frac{1}{4}$  to  $1\frac{1}{2}$  h. p. Prices range from \$25 to \$200.

It will pay you to investigate the complete "Profit-Producing" WYCO Line.

Write or use Quickmail  
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Catalog No. 38.

**WYZENBEEK & STAFF, INC.**

111 M. GARDNER ST. SAN FRANCISCO, CALIF.

41

Stick coupon on your letterhead and sign your name, title and firm name for catalog listing "Safety" socket screw products.

**SAFETY SOCKET SCREW CORP.**

42

Stick coupon on letterhead or postcard and sign name, title and firm for a catalog on the Whitney line of tools.

**WHITNEY METAL TOOL CO.**

43

Stick this coupon on your letterhead and sign name, title and firm for catalog of Marshalltown presses.

**MARSHALLTOWN MFG. CO.**

44

Stick coupon on your letterhead and sign your name, title and firm name for a circular on the Continental band filing machine.

**CONTINENTAL MACHINES, INC.**

45

Stick coupon on letterhead or postcard and sign name, title and firm for bulletin on Rivett No. 112 universal grinder.

**RIVETT LATHE & GRINDER, INC.**

46

Stick coupon on letterhead or postcard and sign name, title and firm for your new Catalog on Federal Test Indicators.

**FEDERAL PRODUCTS CORP.**

47

Stick coupon on your letterhead and sign your name, title and firm name for bulletin on air operated chucks.

**HANNIFIN MFG. CO.**

48

Stick coupon on letterhead or postcard and sign name, title and firm for catalog on DeLore Handee Grinders.

**CHICAGO WHEEL & MFG. CO.**

33

Stick coupon on letterhead or postcard and sign name, title and firm for information on the Hobart Arc Welder.

**HOBART BROTHERS**

34

Stick coupon on your letterhead and sign your name, title and firm name for information on Kearney & Trecker arbors.

**KEARNEY & TRECKER CORP.**

35

Stick coupon on letterhead or postcard and sign name, title and firm for full information on BASA Hammers & Reversible Ratchet Wrench.

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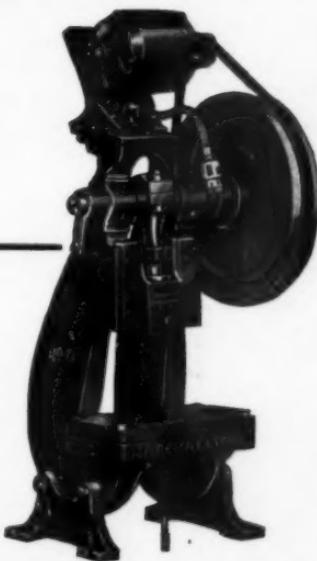
Chicago, Ill.

# MARSHALLTOWN

No.  
O

BENCH  
PRESS

- ★ OPEN
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- ★ INCLINABLE
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- ★ IMPROVED  
BALL AND  
SOCKET  
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## A HEAVIER BUILT PRESS THAT'S "TOPS" IN QUALITY

Here's a press that is built and engineered to give outstanding performance on production schedules. The No. O has improved ball and socket connection—heavier construction—more die space and easier adjustment. Convertible Clutch for single stroke or continuous operation.

★ Send Quickmail Coupon No. 43 today for literature and prices. The Marshalltown Line includes Inclinable Presses to capacity of 70 tons.

**MARSHALLTOWN MFG. CO.**

900 East Nevada St.,

Marshalltown, Iowa

## Van Norman Takes Over Producto-matic Milling Machines

Van Norman Machine Tool Co., Springfield, Mass., announces purchase of the machine tool business of the Producto Machine Co., Bridgeport, Conn. Sale was consummated as of June 8th and an addition has been started to the main Van Norman plant at Springfield to house manufacture of Producto machines.

Included in the line are crank shaft mills, cam type millers, heavy production mills, bed type manufacturing mills, as well as smaller knee type manufacturing machines. The latest addition to this line is the No. 10 Hydro-Cam contour mill, several of which have already been sold to the large aircraft companies for propeller and connecting rod work.

The Producto Machine Co., will continue the manufacture of die sets and

## Something NEW



### in the Economical Live Ball and Roller Bearing Centers

For lathes, hand screw machines, grinders and mills.

Simple, practical construction—long, sturdy, heavy-duty spindle—small head and short overhang.

Radial roller bearing in front end of spindle for smooth operation and strength—roller bearing in back end of spindle for free running and alignment—Vee and angular thrust ball bearing for constant accuracy and to eliminate chatter and end play. Special seal retains lubricant and excludes foreign matter.

Lower cost than any other live center on the market.

*Write for descriptive folder and prices. Order one TODAY on 10-days' free trial. If not satisfactory in every way just return it.*

**MOTOR TOOL MFG. CO.**  
12281 Turner Ave., Detroit, Mich.

fine grey iron castings. They will also service the older type machines previously manufactured.

## Neu-T-Rol Magnetic Chuck Switch and Demagnetizer

Facilitating the release and removal of work pieces from, magnetic chucks and demagnetizing them at the same time—these are the dual objects of the Neu-T-Rol switch (patents pending) developed by the Electro-Matic Products Co., 4820 Deming Place, Chicago, Ill.

The switch mechanism is neatly housed and easily attached to grinders and similar tools on which magnetic chucks are used. Installation is simple as Neu-T-Rol merely replaces the existing switch and the same direct current wires are attached to the device.



Six No. 2 Brown & Sharpe grinders are equipped with Neu-T-Rol switches at the Service Tool, Die & Mfg. Co., 4625 Fulton St., Chicago and they have been giving highly satisfactory service.

The device is particularly useful with the larger magnetic chucks. With these, difficulty is often experienced in removing large work pieces which cling to the chuck because of residual magnetism. The big vertical Blanchard grinder shown is Neu-T-Rol

equipped and large work pieces can be removed easily from the 36-inch magnetic chuck.

On smaller units, another advantage claimed for Neu-T-Rol is that any desired degree of magnetization is available. This is helpful with small, light pieces which might be distorted with full power on the chuck.

The makers assert that Neu-T-Rol eliminates the chances of abraded knuckles, scored and damaged chucks and marred surfaces on finished work,

often incurred in prying or forcing the work free. Where required, full voltage can be used on the chucks to increase holding power and throwing the switch releases the work as though it were made of non-magnetic material.

Full information concerning the device, which is being used by a number of large industrial concerns in the Chicago area, may be had by addressing the makers. Dealers' inquiries are especially invited.

## Ideal Lubrication—Quiet Operation WITH **TIMESAVER LAPPING COMPOUND**

A scientific lapping compound especially prepared for the precise fitting of all types of Gears, Bearings, Pistons, Slides and Valves.



Elevator Gear and Bearings lapped with Timesaver Compound.

**TIMESAVER COMPOUND** will not imbed into any metal or continue to cut.  
Grades for hard and soft metals.

*Send Quickmail Coupon No. 11 for samples and literature.*

**TIMESAVER PRODUCTS CO.,**

33 S. Desplaines St.,  
Chicago, Ill.



### TANNEWITZ Abrasive Cut-off Machine

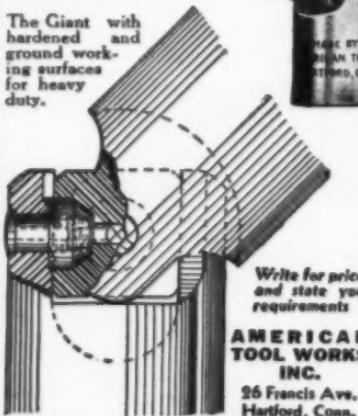
Uses Abrasive Wheels or Saws, and instantly swivels and cuts any angle from 45° left to 45° right, doing clean, instantaneous work on metal bars, shapes or tubes.

**THE TANNEWITZ WORKS**  
Grand Rapids, Mich.

### VANDERBEEK UNIVERSAL JOINTS

The Baby Giant for instrument and control work.

The Giant with hardened and ground working surfaces for heavy duty.

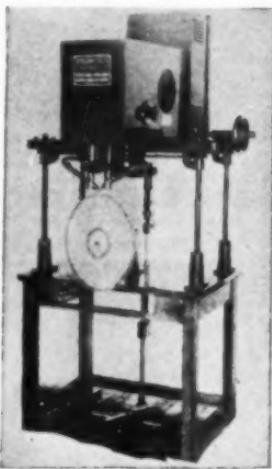


Write for prices  
and state your  
requirements

**AMERICAN  
TOOL  
WORKS  
INC.**  
26 Francis Ave.  
Hartford, Conn.

### Eisler Gasket Welding Machine

The Eisler Engineering Co., of 746 S. 13th St., Newark, N. J. announces a new unit for welding the metal binder on asbestos core gaskets.



Due to the character of the gasket construction, in that the asbestos insulating material separates each complete winding of the metal binder, it is essential that both welding electrodes contact the top of the work. This so-called overhead spot welding prevents the gasket from unwinding by electrically welding the end of the binding strip to that part of the strip directly beneath it in two or three spot welds.

## BROACH and ASSEMBLE SELF-CONTAINED 4 TON GREENERD HYDRAULIC ARBOR PRESS No. H-56-D

Adaptable for assembling, broaching, burnishing, etc. Speed of ram down, 247 inches P. M.; daylight, 16 inches; adjustable ram stroke from  $\frac{1}{2}$  to 16 inches. Complete with 5 HP motor and starter for 220-440-550 volt, 30 or 60 cycle, \$675.00 F. O. B. Nashua. Write for Bulletin No. 102.

We also make 65 styles of Rack and Pinion Presses, as well as Hydraulic Presses from  $\frac{1}{2}$  to 15 tons capacity.

**GREENERD ARBOR PRESS CO., INC.**  
43 Crown Street

Nashua, N. H.

## NICHOLSON CONTROL VALVES

are made in two, three and four-way types for air, oil, water, steam, gas, etc., pressures to 5000 lbs. Style E is a general purpose valve for pressures to

300 lbs. Various metal combinations to suit any medium. Style J is for air and oil only, pressures to 125 lbs. Style H is a balanced hydraulic valve for pressures to 5000 lbs. We also manufacture foot, solenoid and motor-operated valves.



Style J



Style E

Style H

*Bulletins on request.*

**OTHER NICHOLSON PRODUCTS:** Mandrels, Arbor Presses, Flexible Couplings, Steel and Stainless Steel Floats, Steam Separators, Steam Traps, Air Separators, Air Traps, Air Vents, Etc.

**W. H. Nicholson & Company**

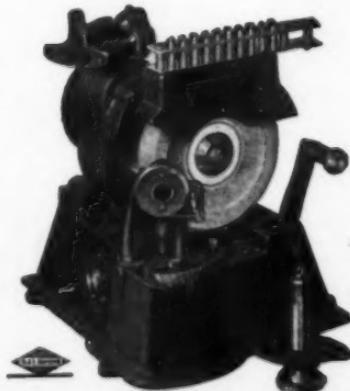
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## "BLACK DIAMOND"

PRECISION DRILL GRINDER



Enables anybody to do a precision job of drill grinding—handles sizes from No. 60 wire gauge to  $\frac{3}{4}$ "—easily, quickly and without any complicated adjustments. Saves time, drills and possible damage to the work.

*Let us send you Bulletin No. 115-H.*

**BLACK DIAMOND**

SAW & MACHINE WORKS, INC.  
NATICK, MASS.

## For Machine and Tool Work & Quick Set-Ups



## - GEARS -

### Spur—Helical—Worm— Bevel—Miter, Etc.

We do broaching and all kinds of grinding.

We specialize in grinding hardened steel bushings, cam rollers, etc.

Prompt service and quality has retained a large list of customers for 25 years.

**TAYLOR MACHINE CO.**

1919 E. 61st St., Cleveland, Ohio

The machine is provided with a handwheel for raising or lowering the electrodes to the approximate welding position. An indication of the flexibility of the machine is its ability to weld gaskets ranging from four to sixteen inches in diameter.

The welder illustrated herewith is foot operated. Air operated and motor driven types are also manufactured. This particular machine has a 10 KVA rating, and is arranged for welding stainless steel gasket binders.

Flow of current during welding is accurately gauged by the timer and contactor, built into the unit. Production is approximately six hundred gaskets per hour.

Provision can be made for winding the gasket materials on the welding mandrel of this machine, thus saving the time required for transferring the gasket from the winding machine, and thereby increasing production.

### Errington Issues Bulletin

Illustrations of the different Errington auto-reverse tapping chucks, die heads, drill press turrets, stud setters, screw drivers or nut setters and multiple heads are shown in a new bulletin issued by Errington Mechanical Laboratory. Over the signature of F. A. Errington, two facsimile letters explain the salient features and advantages of Errington fixed-center multiple heads and other tools.

Further information may be obtained from the New York Office, 200 Broadway, the Chicago Office at 6316 N. Francisco Ave., or the Boston Office, 830 Old South Bldg.

## AN INEXPENSIVE ABRASIVE BAND GRINDER

"Built Like A Machine Tool"

The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on belt. Ball bearing throughout, equipped with Alemite lubrication, complete with grease gun.

Write for illustrated folder on this and other styles and sizes.

**WALLS SALES CORP.**  
96 Warren St., New York, N. Y.



## The Hamilton Portable Elevating Table

The "Portelvator" or Portable Elevating Table is a contribution of The Hamilton Tool Co., Hamilton, Ohio, to lower production costs in the tool room, machine shop and punch press room.



Doing away with the drudgery and heavy lifting in the handling of large dies and machine parts eliminates many opportunities for strained backs and bruised fingers. The "Portelvator" provides an easy means of raising or lowering the heavy parts to the exact height of the machine tool or work bench, after which the work can be slid into the desired position. It may be used as a means of support or to level large overhanging pieces of work, or as a bench on which to work.

A non-elevating type of table is also offered for plants that do not require the lifting feature.

A fast feed mechanism is also available for attachment to the regular elevating type, speeding the lifting in a ratio of 3:1 or 4:1 as required. A brake attachment is also available at slight extra cost for holding the table stationary in any required spot.

Many special sizes of tables have been made for the particular requirements of particular plants.

A six page broadside giving full information will be sent on application.

## BE PROGRESSIVE

In the matter of End Mill equipment . . . that's easy. Simply rely on us for your End Mills, Holders and related Cutting Tools.

There's a type, form and size of PROGRESSIVE Shear Cut End Mill for every job . . . designed and made by End Mill Specialists . . . and guaranteed to satisfy YOU.

If you have any special End Mill problems, our modern facilities and years of experience are at your disposal, without obligation. Just send your blueprints to us for prompt diagnosis and a sure prescription for your trouble.

Anyway, better send TODAY for a copy of our free catalog.

**PROGRESSIVE  
TOOL & CUTTER CO.  
FERNDALE, MICHIGAN**

# BURKE

## MILLING MACHINES

Make Fast Work of Small Jobs

Motor  
Driven

Timken  
roller or  
ball bear-  
ings to  
spindle

*Write today for  
circulars.*

**Burke Machine Tool Co.**  
297 E. 16th St., Conneaut, Ohio



### The Martin Master Collet

The Modern Collet and Machine Co., Ecorse, Mich., have recently introduced the new Martin master collet. It provides an entirely new principle of collet design which is said to offer definite savings in initial costs and also to effect unusual production economy.

The two principal objections to the use of master collets in the past has been in the loosening of pad screws—sometimes to such an extent that the pads would drop entirely out of the collet—and the fact that considerably more time was involved in changing from one size to another than when solid collets were used. The new Martin master collet is claimed to overcome both of these objections.

By reason of its special construction, with the pad screws as integral parts of locking wedges which fit tightly into the end of the collet, the pads will positively not become loose. When it is necessary to change the pads, a few turns of the wedge screws permit quick removal—and with the collet still

### These Better Cap Screws Protect Your Profits

Tough precision-made Triplex Cap Screws save time, speed work by smooth quick assembly—the result of highly accurate forming from strictly specified steel, clean-cut threads, washer faced heads and burnished surfaces. All sizes in standard types of heads and threads. No costly delays in your production line. It's smart profitable buying to standardize on dependable Triplex Cap Screws.

*Write for samples and prices today.*

**The Triplex Screw Co.**  
5377 Grant Ave., Cleveland, O.

**TRIPLEX**  
CAP AND SET SCREWS, BOLTS AND NUTS  
Millions Sold—Used in Every Industry



in operating position in the machine.

An important feature is that the pads and the body of the collet are made of different steels and heat-treated separately. The pads are heat-treated to

a hardness far exceeding that of the body and are made of specially selected wear-resisting steel. The body is made to offer the utmost in both toughness and resiliency throughout its entire length.

Please address the makers for further information.

### Breuer Electric Mfg. Co., in New Quarters in Chicago

The Breuer Electric Mfg. Co., formerly at 852 Blackhawk St., announces moving into a new modern two-story plant and office building covering 20,000 sq. ft. of floor space, and located at 5100 N. Ravenswood Ave., Chicago.

Mr. A. A. Breuer, Founder and President, reports steady growth of the company over a period of 12 years, and also considerable expansion in the Tornado Line of portable electric blowers, industrial vacuum cleaners, electric insecticide sprayers, heat blowers and other electric specialties as reason for the change.

## ACE SPOT WELDERS

**For Economically Fastening or Joining Assemblies of Sheet Metal or Wire**

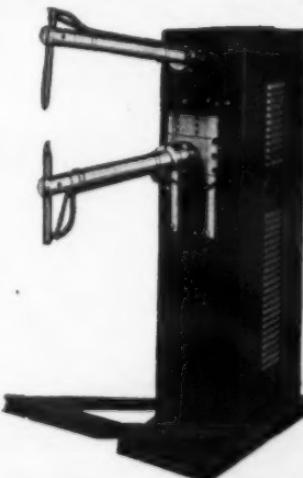
*Cheaper, Faster and Better than riveting*

Modern design, based on simplicity, use of welded steel in place of heavy castings and incorporation of latest developments in resistance welding characterizes these ACE SPOT WELDERS. These factors provide easy, speedy operation, low first cost, low operating cost and dependability. Made in sizes from 5 KW up.

**ONLY      for Series 62 Welder 5 KW**  
**\$90**      Welding capacity  
                   2 Pcs 16 Ga. Steel

*Send for detailed literature and prices today*

**PIER EQUIPMENT MFG. CO.**  
                   WELDING EQUIPMENT DIVISION  
**637 Cross St., Benton Harbor, Mich.**



**GRANT**  
**RIVETERS**

include both Noiseless Spinning and Vibrating Hammer types of machines — also Vertical and Horizontal Multiple Spindle Spinning Machines.

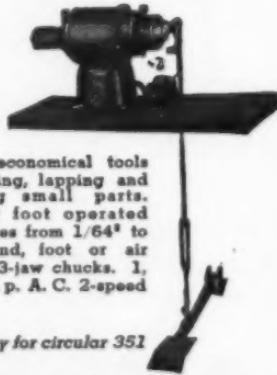
*Send unriveted samples with request for recommendation and quotation.*

**THE GRANT MFG. & MACHINE CO.**  
C. E. Station  
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## Speed Lathes

**Timesavers for Your Plant**



Speedy, economical tools for finishing, lapping and polishing small parts. Hand or foot operated collet, sizes from  $1/64^{\prime\prime}$  to  $1\frac{1}{4}^{\prime\prime}$ . Hand, foot or air operated 3-jaw chucks. 1,  $\frac{1}{2}$  or  $\frac{1}{4}$  h. p. A. C. 2-speed motor.

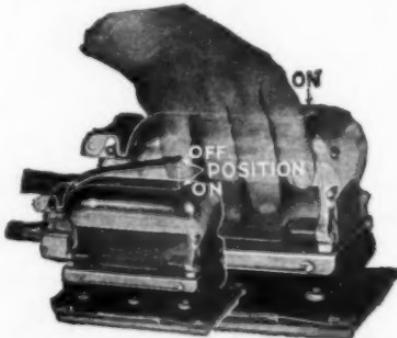
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**Schauer Machine Co.**  
2064 Reading Road, Cincinnati, O.

## Sterling Automatic Valve Control

Thousands of cubic feet of air are wasted daily in plants throughout the country because operators of pneumatic tools neglect to stop their machines while changing operations.

The Sterling Products Co., offer a unique automatic valve control. Without effort on the part of the operator, this device automatically starts and stops the sander and controls the flow of water when hose is attached for wet sanding.



Tests conducted by the Sterling Co. indicate that air wasted will approximate 15 to 35% of that consumed in the machine. It is claimed this waste is eliminated through use of the automatic control. In addition, operating efficiency is increased by leaving both hands to operate the machine and manipulate the product being sanded or rubbed. This is particularly desirable on gas sanding and rubbing applications necessitating freedom of workmen's hands for applying compounds, gasoline, benzine, oil, etc.

The automatic control is designed to fit all model Sterling sanders and is quickly installed by simply removing the hand-operated air and water cams, and attaching to same holes.

Descriptive literature will be forwarded upon receipt of your request for circular No. 1045 addressed to the Sterling Products Company, 2457 Woodward Avenue, Detroit, Michigan.

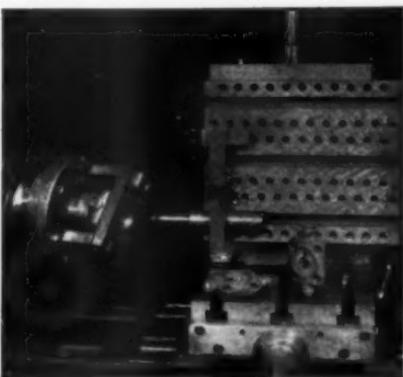
## **Stellite Parts Machined Instead of Ground**

Machine boring and facing to close tolerances rather than finishing by conventional grinding of Stellite faced parts has been worked out successfully in a number of recent installations, using tungsten carbide tools.

The accompanying illustration shows such a set-up for taper boring and facing of a stellite valve seat welded into an alloy cast iron valve body. An Ex-Cel-O general purpose precision boring machine fitted with hydraulic fixture feed cylinder was used.

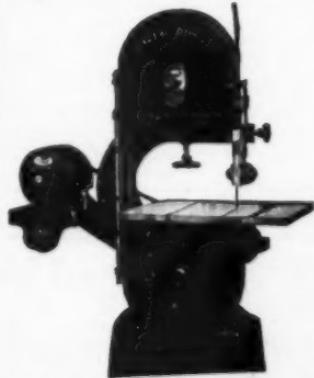
For this operation, a surface cutting speed of 40-ft., per minute worked out well with the tungsten carbide tools, feed being .003-in. per revolution. The spindle of the boring machine was set at a 22-degree angle in order to handle the taper condition. Automatic fixture cross-feed for the facing portion of the operation was obtained through a standard hydraulic cylinder arrangement. The machine, it will be noted,

is equipped with a universal fixture designed to facilitate handling of a variety of small-lot production runs on the same machine.



An idea of the finish obtained by machining in this set-up is provided in the valve specification which called for holding 600-lbs. pressure at 850-deg. F.

## **RACINE Duplex Band Saw**



**Two Speeds**—for cutting wood, steel, brass, copper, tubing, angles, templates.

The ideal all around machine for production shops, tool rooms, pattern shops, laboratories.

**Accurate—Fast—Rugged. Modern,  
High Grade Construction.**

*"Standard the World Over"*

**RACINE TOOL & MACHINE COMPANY**

1754 STATE ST.

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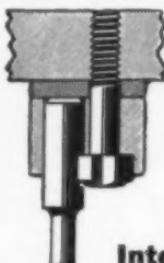
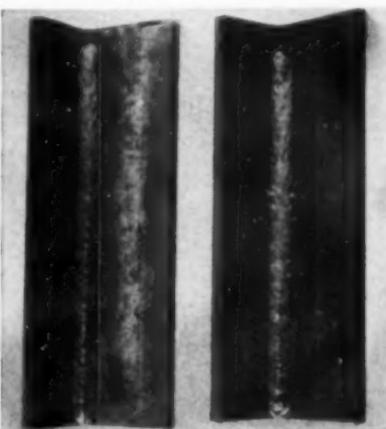
RACINE, WIS. U. S. A.

## Lincoln Announces New Compound to Facilitate Cleaning After Welding

A new compound, said to reduce cleaning time after welding by 20% to 60%, is announced by The Lincoln Electric Co., Cleveland, Ohio.

Known as "Spatter Film", it has been developed by Lincoln engineers to increase the economy of electric welding as a process of manufacture and fabrication. By reducing the ten-

dency of spatter to adhere tightly, fabrication by arc welding is made still more economical, particularly where painting and finishing are essential. The samples illustrated were made under identical conditions, with and without the compound.



### HOVIS Hardened Retainers **Strongest Simplest Interchangeable Punch Retainers Made.**

**EASILY** Locked in — Removed

**NO** Gadgets Springs

Group plates of any size or number of punches, to your requirements.

Catalog on request.

**HOVIS SCREWLOCK CO.**  
3125 E. Larned St., Detroit, Mich.



## THE MODERN AIR GUN

— TRY IT!

For use in Machine Shops, and for all blowing and cleaning purposes . . .  
Leakproof. Mechanically efficient.  
Robust, lever or packing glands.  
Made of bar-brass and stainless-steel. Operated by slight flex of the hose. Used by leading industries. Order a sample for test . . . and you'll find "Air-O-Chek" is the best.

Available at popular prices for  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$  air hoses.

See your Jobber — or write —

**AIR-WAY PUMP & EQUIPT. CO.**  
617 W. Jackson Blvd., Chicago, Ill.



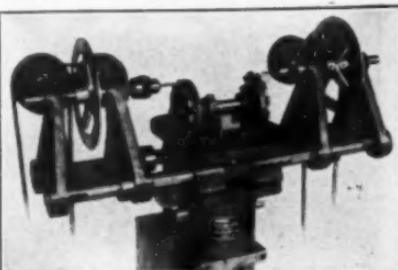
utes using the compound, as compared with 1.04 minutes without it. For a 9-inch single bead, joining  $\frac{1}{4}$ -inch flat steel plates with 3/16-inch electrode, cleaning time with "Spatter Film" was .58 minutes; without, 1.54. Ordinary cleaning tools, consisting of wire brush, flat sharp chisel or old file sharpened as chisel, were employed.

"Spatter Film" is sold in quart, gallon and 5-gallon cans, or 55-gallon drums. The weight is  $8\frac{3}{4}$  lbs. per gallon.

### Rickert-Shafer Double Spindle Machines

Rickert-Shafer Co., Erie, Pa., offer a new unit for the simultaneous production of two threads—tapping or external threading of both ends of rods, tubes and similar shapes. The machine shown is equipped with taps, which for external threading may be replaced with solid dies—or self-opening die heads can be used with a few simple changes. The time saving is evident as two threads are obtained with a single handling.

Automatic feed through chutes or magazines can be provided for many pieces (depending on shape and size) so that all the operator need do is to keep the magazines filled.



The machine shown is equipped with indexing fixtures. After each tapping operation, the next two pieces to be tapped are automatically brought into proper position.

The Rickert-Shafer Co., have specialized on thread cutting equipment for 30-years and invite consultation on thread-cutting problems.



### NOISELESS IN OPERATION

Made in its entirety under the direct personal supervision and exacting standards of the well recognized and able engineer, Leonard Markels. All parts are interchangeable.

Saves cost in sawing, filing and lapping on dies, gauges, tools, etc.

In highest possible quality of material, precision of machining and nicety of adjustments, the "BUTTERFLY" Filing Machine is as painstaking a product as the finest watch movement—and just as reliable.

This skilfully-designed machine is named "BUTTERFLY" because it is as noiseless in its running as a Butterfly in its flying.

*Write for folder C. and E. L.*

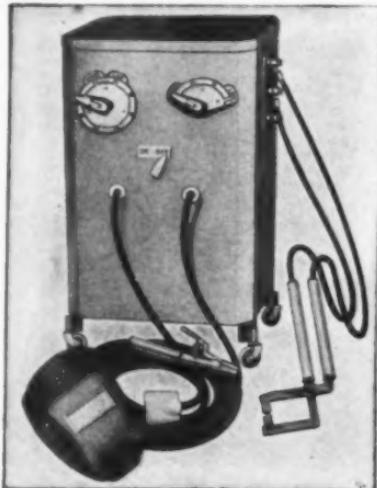
### Harvey Manufacturing Corp.

MANUFACTURING PLANT AND  
EXECUTIVE OFFICES

161 GRAND ST., —:- NEW YORK, N. Y.

## Miller Dual Unit Welder

A combination arc and spot welder, illustrated here, is announced by Miller Electric Mfg. Co., Appleton, Wis., as an addition to their present line of arc

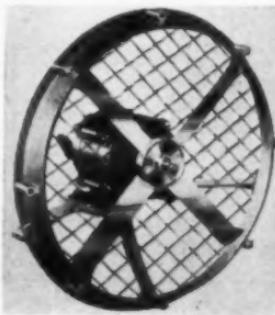


welders. The spot welder is built into their regular No. 2, and No. 3 welders, with capacities of 165 amperes for the No. 2 and 220 amperes for the No. 3. These units are designed to provide arc welders of ample capacity to handle electrodes from  $1/16''$  to  $1/4''$ , and have 32 heat controls, enabling the operator to weld from the lightest to the heaviest metal, and with the addition of the spot welder will handle all sheet metal work. The spot welder

itself has a number of heat controls for different thicknesses of metal. Special spot welding tongs, shown with the welder, are made in different styles to handle individual applications. The new welder is patented in the U. S.

## DeVilbiss Industrial Exhaust Fans

A new exhaust fan, designed to effect rapid movement of a large volume of free air, has been added to the standard line of The DeVilbiss Co., Toledo, Ohio.



Available with  $\frac{1}{4}$ -h.p. or  $\frac{1}{2}$ -h.p., direct-connected motors, these fans provide an effective and economical means of exhaust wherever a general vapor, fume or dust condition prevails.

The ball-bearing, explosion-proof motors meet the requirements of the Fire Insurance Underwriters for handling hazardous as well as ordinary vapors, fumes and dust. Can be installed

### GROUND FROM THE SOLID after hardening



*Write  
for your  
free copy of  
our beautiful  
Catalog—Today*

## SEVERANCE Midget Milling Cutters

Pictured here two-thirds size are just a few of the hundreds of SPECIAL High Speed ground cutters for doing old jobs in a new way.

One customer writes, "We are surprised and pleased at the results . . . it will cut our tool cost at least three quarters."

**COMPLETE REGRINDING SERVICE**  
*Satisfaction Guaranteed*

**Severance Tool Manufacturing Co.**  
**1510 Genesee Ave., Saginaw, Mich.**

in window, wall or ceiling openings.

The  $\frac{1}{2}$ -h.p. motor turns a four-bladed fan 1725 r.p.m. to move 6,350 cubic feet per minute. Where exhaust volume requirements are somewhat less, the two-bladed fan on the  $\frac{1}{4}$ -h.p. motor removes 5,250 cubic feet per minute at the same r.p.m.

Construction is strong and durable. The ring is grey painted cast iron, and blades are of air foil type, made of polished aluminum to provide maximum draft with minimum size and weight. The galvanized wire screen safety guard gives necessary protection when installation is within reach of persons in the room.

Complete information on these Type JG Exhaust Fans, may be secured from the makers.

### Carboloy Tool Performance

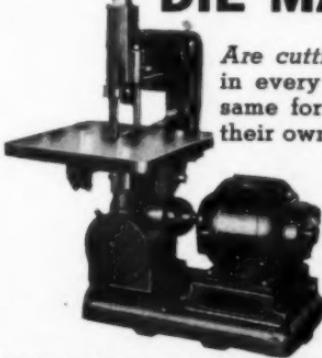
Five Carboly cemented carbide tools used to face and form radius, and bore two diameters on silicon-aluminum motor housings for the Rexair Home Conditioner, are said to have paid for themselves in the first 18-hours of

operation. Their subsequent use during the next 31-days is claimed to have



yielded a 6% "dividend" on the original tool investment every 63-minutes of operation. No resharpening has been required to date. For further details, address the Carboly Company, Inc., Detroit, Mich.

## OLIVER OF ADRIAN DIE MAKING MACHINES



*Are cutting die costs in thousands of plants, in every part of the world. They can do the same for you. Many installations have saved their owners 50 to 60% and more.*

*Install an Oliver today and produce those dies, gages, templates, cams, stripper plates, etc. on a production basis, profitably. They are fast and accurate on all sawing, filing and lapping operations.*

Cut illustrates S-1 model... \$125.00

*Send for literature.*

**OLIVER INSTRUMENT COMPANY**  
1408 E. MAUMEE ST.,

S-1

ADRIAN, MICHIGAN

## THE CHAMPION LINE



**Toolholders, Expanding Mandrels,  
Shop Furniture, Emery Wheel  
Dressers and Cutters, Etc., Etc.**



**Winners on  
merit and  
performance —  
leaders in  
quality and  
design.**

**Write for Catalog**

**The Western Tool & Mfg. Co.  
1632 E. Pleasant St., SPRINGFIELD, OHIO**

## INDEX No. 38

### High Speed Vertical

Low initial cost and  
maintenance.

Simple and easy to  
operate—no gears  
to clash — no  
gadgets to break.  
Hand feed through  
a table designed in  
proportion to the  
capacity of the ma-  
chine enables the  
operator to feel the  
progress of the  
cutter.

Six spindle speeds,  $\frac{1}{2}$  to  $\frac{5}{8}$   
and mill capacity in tool  
steel. 8" cross travel, 16"  
longitudinal. Swivel head  
graduated 90° both ways.  
Operates on 110 volts.

**Write TODAY for full  
specifications.**



**John Blank Machinery  
JACKSON**

**MICHIGAN**

## Resistoflex Tubing for Oils and Solvents

Resistoflex Corp., 370 Lexington Ave., New York, announce the completion of facilities at their Dover, N. J. plant, for the manufacture of "Resistoflex" PVA tubing in diameters up to and including  $\frac{1}{2}$ -in. I. D. Facilities will be provided in the future for production of larger sizes.

"Resistoflex" is the trade mark and trade name employed in the American production of a flexible synthetic resin — basically, polyvinyl alcohol — which is claimed to be inert to gasoline, oils and organic solvents; retains its flexibility throughout a wide temperature range, and has been manufactured, tested and sold on a commercial scale during the past several years by foreign corporations with which Resistoflex Corp. is indirectly affiliated.



It is used abroad in many industrial applications; chiefly in the fuel and brake lines and lubrication systems of automotive equipment, Diesel engines and aircraft; in the conveying of solvents and mineral and vegetable oils in the chemical and process industries; in hydraulic lines; and in fuel and oil handling equipment.

Physical characteristics include extreme lightness — the specific gravity is approximately 1.26, one-half that of

aluminum; great toughness; a remarkable pressure-resistance; good elasticity; and a flexibility so marked that the tubing literally may be tied in knots. It is highly efficient in absorbing vibration.

At present, it is offered in the form of tubing in standard sizes, although gaskets, washers, packing, diaphragms and sheet material are scheduled for later production. Specially-designed couplings have been developed and each tube length with its couplings ordinarily is supplied as a unit.

## Niagara Issues Two New Bulletins

"Pictorial News of Industries" is the title of an 8-page broadside presenting in striking illustrations, views of industries using Niagara presses, shears and machines for sheet metal working. The folder is being sent to the metal working industry to call attention to the latest equipment for the different operations of shearing, blanking, drawing and forming of plate and sheet metal.

Bulletin 70-D presents complete and up-to-the-minute information on Niagara power-operated circle shears, ring and circle shears and flangers. Due to their ready adaptability, these tools often save die investments for operations such as cutting fan shrouds, making airplane parts, steel drums, containers and many similar uses. The bulletin comprises 18-pages 8½x11" and copies may be had by addressing Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y.

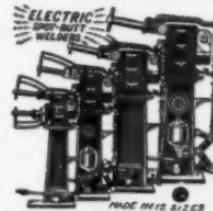
## Weld With EISLER WELDERS

SPOT WELDERS  
BUTT — WIRE — SEAM  
A. C. ARC WELDERS

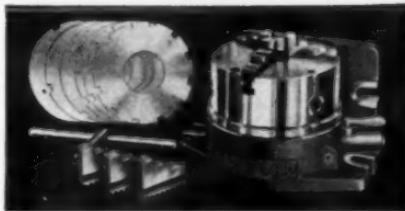
Welders as low as \$25.00

Submit samples for test—no obligation.

EISLER ENGINEERING CO., Inc.  
746 So. 13th St.  
Newark, N. J.



MADE IN 15 SIZES



## MEETS MODERN FEEDS AND SPEEDS

The HARTFORD "Super-Spacer" is absolutely rigid when chuck is mounted in a vertical position. The master index plate simplifies indexing and eliminates chance of error. Indispensable for milling, drilling, slotting or planing—for one piece or thousands.

You'll make no mistake in sending TODAY for full information on this new indexing device.

**Hartford Special Machinery Co.**  
285 Homestead Ave., Hartford, Conn.



Write on your letterhead for free shop sample.

## ● USE LAYOUT FLUID ●

for general machine shop and tool room use on dies, jigs, fixtures and machined parts.

With the use of die blue layout fluid you do not have to polish the surface of the work. Simply wipe surface fairly clean and brush on. DRIES INSTANTLY.

5 oz. 40/- 1 qt. 90/- 1 gal. \$1.50

**DAYTON ROGERS MANUFACTURING CO.**  
MINNEAPOLIS MINN.

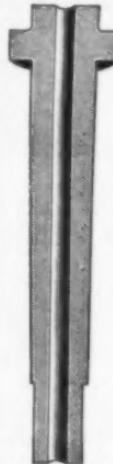
**NEW TOOL HOLDER**

Here's a new tool holder for the lathe that holds four, individually set,  $\frac{1}{2}$ " tool bits. Rigid, accurate, compact and easy to set up.

*Write for Bulletin*

**THE PRESTO TOOL MFG. CO.**  
120 N. Newport Ave., Detroit, Mich.

## We Specialize in **HOLLOW BORING**



LATHE SPINDLES  
SPINDLE SLEEVES  
PISTON RODS  
RAMS  
HYDRAULIC CYLINDERS,  
etc., etc.

ANY GRADE OF STEEL—  
CARBON OR ALLOY.

*Send Blueprints  
for Estimates*

**AMERICAN HOLLOW  
BORING CO.**

1035 W. 19th St.,

Erie, Pa.

**SPEED REDUCERS**

**HELICAL GEARED  
OIL SEAL**

**Offset Motorized Drive**

Compact, rigid, silent and vibrationless. Ball bearing mounted.  
Sizes 1/6 HP. to 3 HP. Ratios up to 6 to 1. Write for bulletin 100.

**GEARS** Precision cut. Any material, quantity or type.  
Prompt delivery.



*Abar*

**GEAR AND MACHINE CO.**

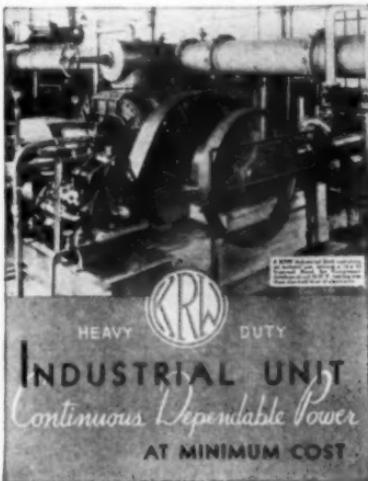
MANUFACTURERS OF  
Speed Reducers & Gears

4412 WEST 16<sup>th</sup> ST. CHICAGO ILLINOIS

**K. R. Wilson Issues Industrial Power Unit Folder**

An attractive new six-page folder in two colors presents a wealth of information on the KRW industrial power unit, built around the Ford V-8 truck engine.

These compact and efficient units are being widely used in industrial plants for generator drives, pumping operations, air and refrigeration compressors, etc.



In the standard set-up, the regular Ford carburetor operates on gasoline. When used for industrial power, this fuel is not subject to the heavy automotive taxes levied in most states. It

is asserted that gasoline at 10c per gallon will produce low cost power and show a material saving over the cost of purchased electric power.

A special bus radiator with truck tanks, wind tunnel and 19-inch high velocity fan driven by twin V-belts afford proper cooling conditions. An improved fly ball type governor can be regulated to operate engine at any required constant speed. Battery, generator and starter are standard equipment and a special exhaust manifold assures freedom from back pressure. An automatic watchman stops the engine before damage can result from lack of oil or water, permitting operation without observation.

Address K. R. Wilson, 10-16 Lock Street, Buffalo, for a copy of the folder—and please mention The BLUE BOOK.

### Carbide Tipped Forming Tools

The cutting tools illustrated show an interesting application of cemented tungsten carbide metal.

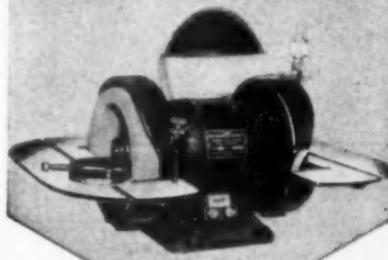


According to G. J. Birgbauer of the Super Tool Co., 356 E. Congress St., Detroit, Mich., the use of the tipped forming tool, both circular and straight, has proven so satisfactory that manufacturers are finding it difficult to keep up with competition while using ordinary tools.

These tools have all the advantages that have been proven in the use of straight carbide tipped tools, in the matter of longer grind life, greater speeds, and shorter machine down time.

The Super Tool Co. is prepared to study problems along this line and submit their recommendations upon request.

## PROSSER Cemented Carbide Tool Grinder



**\$97.50**  
COMPLETE

10-DAY  
TRIAL  
OFFER

## INCREASES TOOL LIFE REDUCES TOOL BREAKAGE

This modern Cemented Carbide Tool Grinder not only removes metal fast when rough grinding but also finish grinds tools to smooth, keen cutting edges. A diamond wheel can be used for finish grinding instead of silicon carbide wheel regularly furnished.

When equipped with proper wheels, this grinder is unexcelled for the proper grinding of high speed steel, Stellite, and all other types of cutting tools.

*Write for details.*



## Bliss 350-Ton Hydro-Dynamic Press

A new 350-ton capacity hydrodynamic single-action Press is offered by The E. W. Bliss Co., Brooklyn, N. Y. Of the open rod type with a moving down slide, the latter is guided on all four rods by removable bronze bushings. Equipment includes the Bliss oil operating system, Bliss all-electric control, and an integral pumping system.

### LET US QUOTE...



Our new modern plant is fully equipped with special machinery for

#### **COMMERCIAL JIG BORING, DESIGNING AND BUILDING of DIES, JIGS AND FIXTURES LARGE OR SMALL**

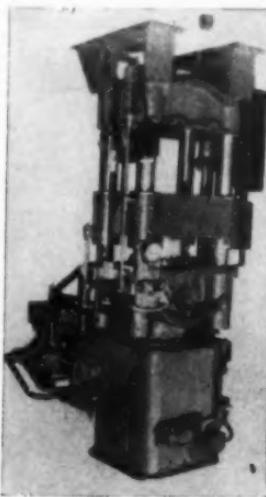
We can handle your Jig Boring jobs at reasonable prices on our new 18"x36" Pratt & Whitney Jig Borer. Quick service.

Have been delivering satisfaction since 1929—let us serve you.

#### **QUALITY TOOL & DIE CO.**

Ray W. Rice, Manager,  
401 N. Noble St., Indianapolis, Ind.

Maximum stroke is 12-inches but by a simple control adjustment, any desired stroke below 12-inches can be obtained in any part of the full stroke travel. The slide has a high-speed approach to the work and changes automatically to the pressing speed.



This speed change can be made just before work is contacted, or by a simple control manipulation, change of speed can be delayed until after work is contacted and pressure starts to be exerted. The press will continue its pressing speed until a selected pressure is obtained after which it will automatically reverse and return to the starting position at high speed. If desired, automatic reversal can be ob-

### **ANNOUNCING THE IMPROVED M-B "SUPER-SPEED" AIR GRINDER**

**Steel Construction  
Throughout**

**THRILLING  
SPEEDS**

**Positive Quick Acting  
Air Control Valve**



**Operates on Air  
Pressures of  
40-100 Pounds**

**AMAZING  
POWER**

**M-B PRODUCTS**

**The ONLY Hand  
Grinder With  
Spindle Speed  
of 100,000 R. P. M.  
On 100 Pounds  
Air Pressure**

**WRITE FOR DETAILS  
130 E. LARNED ST.  
DETROIT, MICH.**

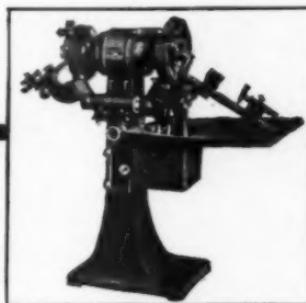
tained after the slide has traveled a given distance instead of after attaining a given pressure. Selection of one method or the other is by a simple adjustment of the control rods.

Press action is very rapid due to an oversized prefill valve of the normally open balanced quick acting type, making it possible to obtain as high as 40 to 45 strokes a minute when operating on a short stroke, as in coining and embossing work. When equipped with an automatic feeding device and arranged for continuous operation, a production of 1800 coined pole pieces per hour for starting motors is obtainable.

Control is electrical throughout, for production and inching. This provides maximum flexibility. The press can be started by foot-button or hand-button as desired, and multiple starting buttons can be provided. Likewise, any number of emergency stop-buttons can be provided. Electric control is so arranged that the press will stop practically at once when a stop-button is depressed. The inching control is by means of push-buttons, the press operating only as long as the push-button is depressed. It is possible to move the slide in increments as small as  $\frac{1}{8}$  to one-inch, on inching control.

The bed and slide areas are 30-inches square; the shut height is 15-inches; the overall height is slightly over 12-feet; the weight is about 18,000-lbs.; and a 30-h.p., 850-r.p.m. motor is required.

Address the makers for any further details and please mention The BLUE BOOK.



USE THIS

### GRAND RAPIDS DRILL GRINDER

AND YOUR DRILLS WILL CUT FASTER  
STAY SHARP LONGER  
PRODUCE MORE AND BETTER WORK  
BULLETIN ON REQUEST

GALLMEYER & LIVINGSTON CO.  
405 Straight Ave., S. W.  
GRAND RAPIDS, MICHIGAN

HOW MUCH



**COMFORT**

CAN YOU BUY?

ROOMS  
from \$1.50  
WITH  
BATH  
\$1.75  
also  
WEEKLY  
RATES

- A wonderful bed; a clean, quiet room; pleasant, efficient service; and a friendly atmosphere — these are what you get, and all you pay for, at the Madison-Lenox. No frills—just genuine comfort and consequently, genuine economy. An excellent location, with garage nearby.

VERNON W. McCOY, Gen. Mgr.

Detroit

HOTELS  
**MADISON and LENOX**

MADISON AVENUE AT  
GRAND CIRCUS PARK

**NOPAK**  
**AIR VALVES**  
3 and 4 Way

GALLAND-HENNING MFG. CO.  
2753 S. 31st St., Milwaukee, Wis.

## L-R FLEXIBLE COUPLINGS



PATENTED

The efficiency of the L-R principle of coupling is self evident. If you had one to examine, you'd probably agree.

Send us R.P.M., H.P. and Shaft Dia. and we will send you a test sample of 1A; bores  $\frac{3}{16}$ " to  $2\frac{1}{4}$ ". Write.

**LOVEJOY FLEXIBLE COUPLING CO.**  
5026 W. Lake St., Chicago, Ill.

## MICROMETER OFFSET BORING HEADS



No. 35

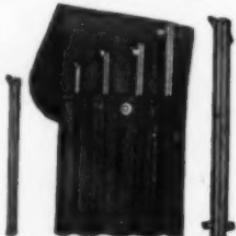
\$60.00

A New Flynn Micrometer Offset Boring Head

Write for catalogue.

### Boring Bars

The new small bars  $\frac{1}{16}$ ,  $\frac{1}{8}$ ,  $\frac{3}{16}$ ,  $\frac{1}{4}$  and  $\frac{5}{16}$  in. dia. Set of 4—\$5. Larger bars up to  $1\frac{1}{2}$  in. diameter.



**Flynn Manufacturing Company**  
435 Bates Street Detroit, Michigan

A recent development in the shearing industry is a new busheling alligator-type shear announced by The Canton Foundry and Machine Co., Cleveland, O.



This new shear is said to open entirely new fields of operation because of its low cost investment, ideal adaptability to small users and in relieving large shears for heavier operations.

With longer knives and larger jaw opening than heretofore used on low priced shears, its speed of 50 cuts per

## SOUTH BEND Precision LATHES

Back-Gearied, Screw Cutting, Metal Working

9", 11", 13", 15" AND 18" SWING  
3' TO 12' BED LENGTHS

PRICED \$85 TO \$1500

WRITE FOR CATALOG

**SOUTH BEND LATHE WORKS**  
879 E. Madison St., South Bend, Ind., U.S.A.

## COLWELL Tool Post Turrets



18" Lathe Size

Why lose time, money and production—use a turret.

Made in sizes to suit lathes from 9" to 18"—also for turret lathes.

New!!! "Midget" size for small lathes, Cataract, etc.—four positions—fast—simple—accurate.

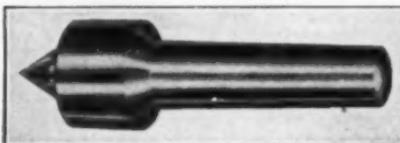
**S. G. COLWELL, 25 Congress Ave., Providence, R. I.**

minute makes short work of skeleton scrap, pipe up to 2-in., round or square bars to 1½-in., oil cans, light sheets, metals, auto bodies, fenders, and miscellaneous scrap for busheling.

More information and mechanical details may be obtained on request to the manufacturer and please mention The BLUE BOOK.

### Live Ball and Roller Bearing Centers

Motor Tool Mfg. Co., 12281 Turner Ave., Detroit, Mich., offer a new type of live center with numerous attrac-



tive features. Sealed with a special oil, these centers are said to require no attention for years to come.

Four parts comprise the device, and

the filler is inserted under a pressure of one ton. 100 minimum grinds are claimed for each filler, which will be replaced on being returned to the makers, and they charge only for the new filler. Fillers are made of a special alloy molybdenum high speed steel, treated for extreme hardness and precision ground. Cemented carbide tips can be furnished if desired.

A four page folder gives complete information and copies may be had by addressing the makers.

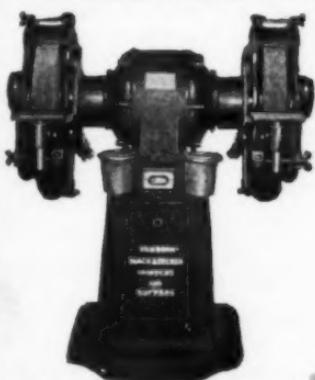
### CARROLL Universal Dividing Heads

20 Years of Popularity. 6<sup>8</sup>, 10½<sup>8</sup>  
12<sup>8</sup> Swing, Right or Left Hand  
Type.



WM. CARROLL & SON  
1776 Lexington Ave., (Norwood) Cincinnati, Ohio

## MARSCHKE Heavy Duty Grinders and Buffers



A catalog showing seventy different grinder and buffer specifications will be sent promptly upon receipt of request.

Considering only such major specifications as weight and sizes of motor, wheels, bearings, spindle diameters, you'll find a lot of other machines to compare with MARSCHKE ELECTRIC GRINDERS and BUFFERS.

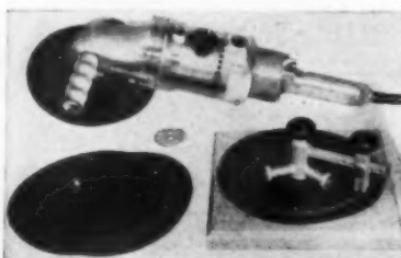
But do not overlook the less spectacular and more important items of material specifications, workmanship and particularly the provisions for lubrication, bearing and motor protection, and above all the details of wheel guard construction.

Let us tell you about the details accounting for the superiority of MARSCHKE GRINDERS and BUFFERS.

**Vonnegut Moulder Corp.**  
1805 Madison Ave., Indianapolis, Ind.

## Van Dorn Two-Speed Electric Sander

A versatile two-speed sanding unit, adaptable for use with 7 and 9-inch abrasive discs, is announced by the Van Dorn Electric Tool Co., Towson, Md. Developed to eliminate the necessity of purchasing two tools of different speeds in order to use 7 and 9-inch



discs, this tool fills a definite need in general sanding operations. As most of the wear on a sanding disc occurs

toward the outer edge, it is possible, with this unit to get the maximum wear from a 9-inch disc and, by trimming off the worn outer surface, obtain a 7-inch disc that is practically unused. A disc cutter is furnished with each tool which is simple and easy to use.

Speed adjustment is made by a simple gear shift arrangement in the gear housing, which alternately engages two different sets of double gears. Armature and intermediate gears are spiral and the spindle gear is spiral-bevel. A patented gear locking pin facilitates interchange of flexible pads and the gear-shifting adjustment.

Two moulded pads (7 and 9-inch), together with three 9-inch abrasive discs are supplied with each tool. The no-load speed for the smaller discs is 4,200-r.p.m.; for 9-inch discs, 2,700-r.p.m. A universal motor, operating on a.c. or d.c. is standard equipment.

## CENTERLESS GRINDING

**17** years' experience with  
all types of work and  
materials.

Equipped to give you production grinding  
to total tolerance of .0001 in.

*Inquiries Solicited—  
Prompt Service*

**ERTEL MACHINE COMPANY**

1420 East 20th St., Indianapolis, Ind.

**POLISHING**

**HEAT TREATING**

## Ruthman Pump For Molten Metals

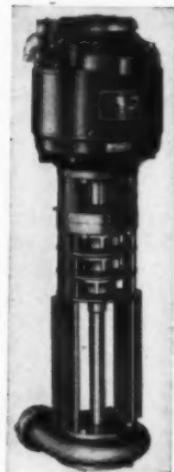
Pumping molten solder, lead or babbitt is a job that's a bit out of the ordinary. Yet The Ruthman Machinery Co., 538 E. Front St., Cincinnati, O., had inquiries for a pump to be used in such work. The Model 15028 was developed as a consequence.

Offhand, the heat condition ranging from 600 to 650-deg. F., a specific gravity of about 10 and hardening of the metal on cooling introduced some perplexing problems. Realizing that the heat would injure motor and bearings if it could rise to them, this was prevented by a heat dispenser, comprising a series of aluminum fans mounted on the vertical shaft, within an open lantern housing in the form of compartments with fins between. The lower anti-friction bearing is mounted in a separate housing, two inches below motor and directly above the heat dispenser.

Twin intakes are provided, one into the eye above, and the other into the eye below the impeller, with a generous size venturi effect passage around the impeller chamber. The small impeller has blades of special shape to handle the heavy metals efficiently. Capacity is given as approximately 600-lbs. per minute, and it is asserted the flow can be throttled without building up pressure or overloading the motor.

Top motor frame is provided with lifting lugs and the extension arms have key shaped guides for raising unit from reservoir when not in use. In the Ruthman design, there are no packing glands or equivalent, and anti-friction bearings are used throughout.

For further information, please address the makers, mentioning The BLUE BOOK.



\$100 Worth of  
**CERROMATRIX**  
Saved 100 Hours on This Die



Mr. George Schader, of R. H. Brown & Co., New Haven, Conn., reports a saving of more than 100 hours by using CERROMATRIX in the piercing die shown above.

And this is only one of many cases where small amounts of CERROMATRIX used for securing punch and die parts have made outstanding savings in producing metal-working dies for long as well as short runs on metals up to 5/32" thick. These dies are used by some of the largest manufacturers in the country.

Also CEROBEND for tube bending and CERROBASE for reproducing master patterns accurately at low cost. Other low-temperature-melting alloys for special applications upon specification.

*Send for booklet or trial order.*

**CERRO DE PASCO  
COPPER CORPORATION**  
44 Wall Street, New York, N.Y.  
British Associates: Mining & Chemical Products, Ltd., London, England

## Machinists Tool Grinding Co., in New Quarters

Constantly expanding business and the need for more room has compelled the Machinists Tool Grinding Co., to move into larger quarters at 2834 West Lake St., Chicago. The new two story plant will give plenty of elbow room, and the management will maintain the same high standards of workmanship and service responsible for the rapid growth of this enterprise.

**ROGERS**  
Circular Knife  
Grinder

For circular or rotary knives up to 20<sup>4</sup> diameter. Unusually low price.

Type "CC" Write for bulletin CC.

**S. C. ROGERS & CO.**  
205 DUTTON AVE., BUFFALO, N. Y.

## For Every Coolant Need . . .

There's a GUSHER Coolant Pump of the proper type and the right size for every coolant need — and GUSHER Pumps stand up in the hardest kind of service.

They're self-priming — have fewer wearing parts — never require re-packing — no metal-to-metal contacts — bearings are protected from abrasive matter.

Send NOW for full information.

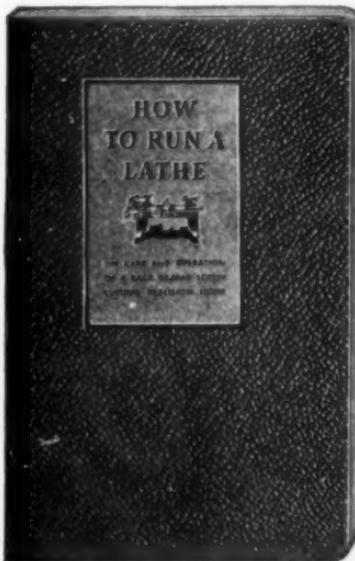
**The Ruthman  
Machinery Co.,**  
538 E. FRONT ST., CINCINNATI, O.



## How to Run a Lathe

A machinist's manual, "How to Run a Lathe", in a new 34th edition, is announced by the publishers, the South Bend Lathe Works.

The new edition has been completely revised. The material is divided into chapters and sub-headings according to machining operations, beginning with the elementary work, and progressing to the more advanced metal working jobs.



The new book has 128 pages and contains over 350 illustrations, showing practically every type of lathe set-up, and methods for handling all important machining operations. The book has the latest and most authoritative information available on modern lathe practice. Besides dealing with all phases of lathe work, a generous amount of general shop information is included, such as reference tables and formulae, rules, gauges, specifications, shop hints, etc.

Copies are 25c each, and will be mailed postpaid anywhere in the world.

Stamps or coin of any country are accepted. Copies may be had by writing to the South Bend Lathe Works, South Bend, Indiana.

### Kent's Handbook

The new 11th edition of Kent's Mechanical Engineer's Handbook, Design — Shop Practice volume, is announced by John Wiley & Sons, Inc., 440 Fourth Ave., New York City.

The new policy of dividing the handbook into two volumes (the companion book being on Power), permits a more thorough treatment and inclusion of many subjects that could not be encompassed in a single volume, without making it inconveniently bulky.

These handy reference books contain a wealth of useful, practical, authentic engineering information, indexed so the facts may be located readily. Important developments of the last decade are included. The book sells for \$5.00 net. It is a good investment for any engineer.

### DO IT QUICKLY—

#### WITH A HANDNIB

Cuts sheet metal into any shape desired — in 1/10th of the time usually required — three-tools-in-one — a Nibbler, a Shear and a Drill Rod Cutter.



Indispensable for Toolroom and Experimental Work. Saves up to 90% on templates and trial blanks.

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**NATIONAL MACHINE TOOL CO.**  
1536B Clark St., Racine, Wis.

## NOW— ANY SIZE OR LENGTH

### TUNGSTEN CARBIDE

**BARS**— for greater wear-resistance, accuracy, and finish on Centerless Grinder Blades, Quenching Blocks, Wear Plates, Guides, Solid Tool Bits, etc.

**RODS**— for Winding Arbors, Plug Gauges, Internal Grinder Work — Rollers, Centers, etc.

**BUSHINGS**— for Ring Gauges, Forming Dies for stamping shim stock, Drill Bushings, Broaches, etc.

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**METAL CARBIDES CORP.,**

Youngstown, Ohio



**LUMA**

Combination  
Etchtool —  
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Tools  
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Luma Marking and  
Demagnetizing SIMULTANEOUSLY

Writes on hardened steel — demagnetizes at the same time—with carbon point does light spot annealing and soldering jobs. Compact—easy to use—dependable.

*Send for details—5-day FREE TRIAL OFFER!*

**Luma Electric Equipment Co.**  
Dept. H—Main P. O. Box 132, Toledo, Ohio



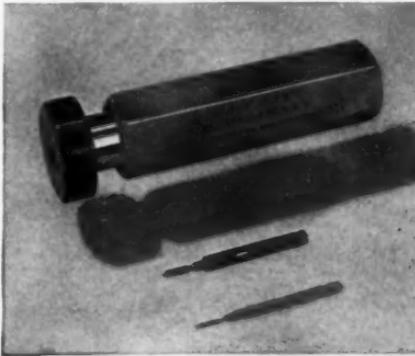
## Why Not Modernize

your present equipment by using the RUSSELL BORING BAR? Bores holes from 9/16" to 12" dia. with axis of boring bar parallel to axis of the shank, in one compact tool, with micrometer adjustment.

**RUSSELL BORING BAR CO.**  
MIDDLETOWN, OHIO

## Lincoln Park Threads Carboloy Gages

The Lincoln Park Tool and Gage Co., Lincoln Park, Mich., have recently been successful in the manufacture of thread plug gages in which the threads were ground in Carboloy cemented carbide. While this company has had considerable experience in thread grinding in solid Carboloy—as in the manufacture of small-diameter taps and work of a similar nature—it is an outstanding accomplishment to produce threads in Carboloy cemented carbide to gage limit accuracy.



The illustration shows two thread plug gages, representative of two orders recently completed by this concern. The larger gage was manufactured for a well-known camera manufacturer for use in gaging the threads in a camera shutter case. The threaded portion is a shell of Carboloy cemented carbide brazed to a steel shank. The diameter of this gage is 37.4 mm. (1-15/32-in.), with 50 pitch threads. The small gage is of 1/8-in. diameter and is being used for gaging threads by a large business equipment manufacturer. The threaded portion of this gage is solid Carboloy and is butt brazed to a standard gage shank. It has 44 pitch threads.

The company is equipped to produce Carboloy Thread Plug Gages in larger and smaller sizes than the examples illustrated, and can produce both finer

and coarser thread pitches. They guarantee that any degree of accuracy which can be secured in thread grinding in steel can be equalled in the methods which they employ in grinding threads in Carbolyte cemented carbide.

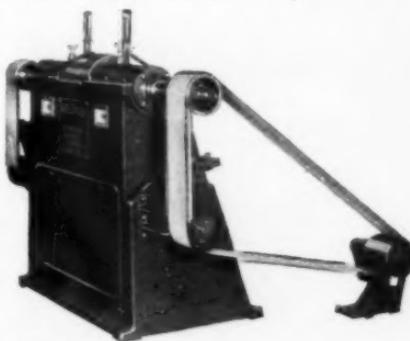
### Combination Polishing Lathe and Belt Sander

The Hammond Machinery Builders, Kalamazoo, Mich., announce a new Rite-Speed double spindle combination polishing lathe and belt sander.

The machine as shown has two separate and distinct spindles, each independent of the other and each operated by its own motor, starter, multi "V" belts, switch and brake. Belt sanders can also be mounted on the double end single spindle Rite-Speed polishing and buffing lathe as manufactured by this company.

Either end can be used for polishing or buffing or for sanding. In order to convert the lathe from a sander to a polisher, it is only necessary to

remove the drive pulley mounted on the spindle and replace it with a buffering or polishing wheel.



This machine will be of particular interest to concerns that do not have enough sanding to warrant purchasing single purpose equipment as with this new Hammond combination machine you can polish, buff or sand and it only takes a few minutes to change operations.

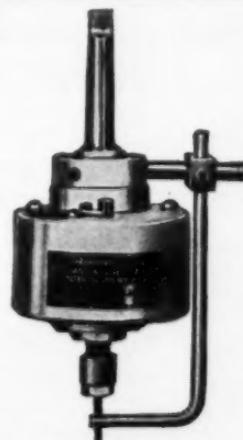
## ERRINGTON HYS PD

### Super-Sensitive Ball Bearing CONE DRIVE 2 to 1 Auto.Reverse Tapping Chuck

- Combination Bronze and Ball Bearings Throughout.
- Easy and Economical Replacement of Cone-Clutches.
- Depth gauge facilitates Quick Handling especially on Bottom-Holes.
- Other Styles and Sizes 0° to 2° taps.

Size	Taps in Steel	Taps in Cast Iron	Price	Code
No. 00	0° to 3/16"	to 1/4"	\$35.00	Phism
No. 0	to 3/8"	to 1/2"	\$50.00	Phalanx

The principle on which this style is designed is especially effective on very small tapping; whereas in the No. 0 size the Frictional Grip is greatly INTENSIFIED, to cover a wider range, without loss of sensitiveness.



## Errington Mechanical Laboratory

Main Office and Works: STATEN ISLAND, New York

Chicago Office:  
6415 N. Richmond Street

New York Office:

200 Broadway

Boston Office:

830 Old South Bldg.

## Reconditioning Service on Gage Blocks Extended

Cost of precision measurement for many industrial firms should be reduced materially through a new service of the Ford Motor Co., Johansson Division which extends reconditioning operations for the first time to gage blocks of 2, 3 and 4-inch size.

Previously, reconditioning service was available only for blocks of the

5-inch size or larger. Under a secret process now, blocks which have become worn in service beyond their original accuracy can be renewed in most cases, thus virtually doubling their useful life at a cost considerably less than that of new blocks. After such reconditioning, blocks are returned to their owners guaranteed to within their original accuracy.

Reconditioning is combined with an inspection service by which gage block sets are accurately tested for size and possible "high spots." Blocks showing need of reconditioning can be serviced and returned to owners in about one week.

## Squeeze Riveter Catalog By Hanna

A handsome new 28-page two-color catalog, issued by Hanna Engineering Works, 1763 Elston Ave., Chicago, covers very completely the subject of squeeze riveters to fit the job. The many different types of Hanna riveters are illustrated in actual use on typical applications with clear and concise explanatory text. Anybody with riveting problems, large or small, will do well to write for a copy.

## G-E Rewards Ingenious Employees

General Electric Co., announces that during 1937, employees received nearly \$85,000 for new ideas submitted through the company's suggestion system. During the year, almost 37,000 suggestions were made by workers and more than 12,000 were adopted. During the



### RED HEAD

#### ETCHERS and DEMAGNETIZERS

Let us tell you the many advantages of our new D. C. and A. C. models now available. Also, see our new line of Magnetic Parallels and Midget Chucks.

*Send TODAY for latest circulars*

**PRINTZ ELECTRIC CO.**  
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DETROIT, MICHIGAN



**Machinists Tool Grinding Co.**  
2834 W. Lake Street  
CHICAGO, ILLINOIS

## WHY DISCARD DULL POWER HACK SAW BLADES?

Your dull blades can be sharpened over and over again at the low cost of  $2\frac{1}{2}$ ¢ per inch (12 blades or more).

### Have You Thrown \$100 In Your Scrap Heap?

One customer of ours, who formerly threw away his dull hack saw blades, reclaimed \$100 worth of blades from his scrap heap.

past 11 years nearly \$600,000 has been paid to employees for new ideas adopted for use.

### A Shock-Proof Portable Pyrometer

Illinois Testing Laboratories, Inc., 420 N. La Salle St., Chicago, Ill., announce a new type portable pyrometer with a number of outstanding improvements.

The movement is spring suspended within the case to minimize the effect of jars and shocks.

The pivots and jewels of the movement are especially designed to withstand unusually severe service.

A new type of pointer lock damps the movement of the indicator pointer when the instrument is carried or transported.

An unusually heavy metal case is provided to prevent breakage if the instrument happens to be dropped.

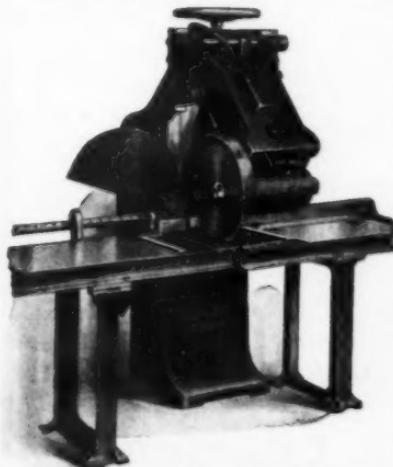
Shatter-proof glass is used and the scale length is five inches.



The instrument is  $7\frac{1}{8}$ -inches wide,  $6\frac{1}{8}$ -inches high and  $2\frac{1}{2}$ -inches thick.

Address the makers for more complete information, and please mention The BLUE BOOK.

## "OLIVER" CUT-OFF SAW



**OLIVER MACHINERY CO.,**

**cuts mouldings, tubes, strips  
of metal and compositions  
. . . accurate to .005-inch**

**Straight or Angle Cuts • Compact  
Ball Bearings • Extremely Accurate**

*Saves you time, space, money!*

Metal workers find this machine very efficient on production work. Makes straight or angle cuts with saw or cut-off wheel. It is self contained and unusually compact. Runs very lightly without any rebound. And it will cut hundreds of pieces without variation of .005 inch. Has high speed precision ball bearings for smooth operation, long life and low upkeep.

\* Write for Circular

**GRAND RAPIDS, MICH.**

## Ideal Variable Speed Transmission

The Ideal "Selecto-O-Speed" transmission, is a new, entirely different type that is very inexpensive and uses only standard "V" belts. It easily gives an infinite selection of speeds over a 5 to 1 or greater ratio by simple movement of a control lever.

The device should be useful in modernizing old equipment. It is applicable to all machinery that is now operating at a fixed speed, where variable speed is necessary or desirable. Compact and flexible design makes it easy to build this new transmission into the original design of new equipment. Several sizes are available up to 7½-h.p.

The speed variation is effected by an ingenious arrangement of two interlocking sheaves. These sheaves may be pivoted laterally by a slight movement of a control lever, changing the driving and driven belt tensions. This automatically causes the sheaves to ad-

just themselves to a new pitch diameter for the new speed ratio.



Construction is simple and rugged — ball bearing throughout — with a minimum of wearing parts. It works without noise or vibration in any position.

The unit is made by the Ideal Commutator Dresser Co., 1441 Park Ave., Sycamore, Ill.



*Write for circular.*

Control air pressure with Norgren Regulators — give your tools a chance to do what they're intended to do. Only Norgren Regulators have phosphor-bronze diaphragms floated on resilient members for quick bounce-back.

**C. A. NORGREN CO., INC.**  
214 Santa Fe Drive, Denver, Colorado

## M-B Improved Air Grinders

In addition to the M-B heavy duty air grinder, an improved super-speed model is offered. It is of steel construction throughout and especially useful for deep cavities and hard-to-get-at places. Air is controlled by a positive, quick-acting valve.



The spindle is of heavy construction, heat treated and ground to close limits. Ball bearings are of the Bakelite retainer self-aligning type, rigidly held on spindle.

The super-speed is recommended where a combination of speed, power, precision, compactness and efficiency are required. The small mounted

grinding wheels used, operating at unusually high speeds, assure fast work and clean-cut areas. A patented dirt filter in hose protects working parts from foreign matter in air lines. Grinding wheels, cutters, rotary files, etc., with  $\frac{1}{8}$  or  $\frac{3}{16}$ -in. shanks, are handled.

Super-speed units are packaged in mahogany cases with hose line 7-ft., long fitted with dirt filter, 2 wrenches and 4 mounted grinding wheels.

Address M-B Products, 130 E. Larned St., Detroit, Mich., for copy of a new bulletin giving complete information on the improved super-speed and heavy duty models.

## "Facts About Stanley Electric Screw Drivers"

This new booklet represents a serious effort to compress into eight pages, all the essential information suggested by the title. It tells and shows where and why Stanley electric screw drivers are used in industrial plants,

Copies may be had by addressing Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.

## *Mall* Flexible Shaft Grinders

make **COMPLICATED** grinding  
and polishing jobs **SIMPLE**.

If you have grinding and polishing jobs that are hard to do, submit them to us for solution. There is a MALL flexible shaft grinder with the proper attachment for each specific grinding, sanding, and polishing job.

**MALL TOOL COMPANY**  
7742 South Chicago Avenue,  
Chicago, Illinois

OFFICES AND DISTRIBUTORS IN  
ALL PRINCIPAL CITIES



MALL 21524-C four-speed flexible shaft unit.

MALL 21524-C four-speed unit polishing stainless steel dairy equipment.

## Buyers' Directory

### **Abrasive Compound**

Timesaver Products Co., 33 S. Desplaines St., Chicago, Ill.

### **Abrasive Cut-off Machines**

Challenge Mfg. Co., Grand Haven, Mich.  
Tannevertz Works, Grand Rapids, Mich.

### **Angle Iron Cutting & Notching Machines**

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

### **Angle Plates, Adjustable**

McMahon Co., Frank, Dayton, Ohio

### **Arbors**

Kearney & Trecker Corp., Milwaukee, Wis.

### **Automatics**

National Acme Co., Cleveland, Ohio

### **Balancing Ways**

Anderson Bros. Mfg. Co., Rockford, Ill.  
Sundstrand Machine Tool Co., Rockford, Ill.

### **Baling Presses**

Galland-Henning Mfg. Co., Milwaukee, Wis.

### **Band Saw Machines, for Metal**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
Delta Mfg. Co., Milwaukee, Wis.  
Grob Bros., Grafton, Wis.  
Oliver Machinery Co., Grand Rapids, Mich.  
Tannevertz Works, Grand Rapids, Mich.  
Wells Mfg. Co., Three Rivers, Mich.

### **Bar Cutters**

Buffalo Forge Company, Buffalo, N. Y.

### **Belt Lacing**

Armstrong-Bray & Co., 315 N. Loomis, Chicago

### **Belt Sanders**

Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.

### **Belts, V-Type**

Delta Mfg. Co., Milwaukee, Wis.

### **Bending Machines, Hand and Power**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
Buffalo Forge Company, Buffalo, N. Y.  
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

### **Bending Rolls**

Buffalo Forge Co., Buffalo, N. Y.  
Marshalltown Mfg. Co., Marshalltown, Ia.  
Ward Machinery Co., 564 W. Washington, Chicago, Ill.

### **Bins**

Interior Steel Equipment Co., Cleveland, O.  
Stackin Corp., Providence, R. I.

### **Blower Wheels (Birocco Type)**

Janette Mfg. Co., 556 W. Monroe St., Chicago

### **Blowers, Portable Electric**

Breuer Electric Mfg. Co., 5108 N. Ravenswood Ave., Chicago, Ill.

Buffalo Forge Company, Buffalo, N. Y.

Clements Mfg. Co., 6650 Narragansett, Chicago

General Blower Co., 401 N. Peoria St., Chicago  
Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.

### **Bolts and Nuts**

Triplex Screw Co., Cleveland, Ohio

### **Books, Engineering and Technical**

Lincoln Electric Co., Cleveland, Ohio

Starrett Co., L. S., Athol, Mass.

### **Boring Bars**

F. A. Maxwell Co., Bedford, Ohio

Russell Boring Bar Co., Middletown, Ohio

### **Boring Heads**

Flynn Manufacturing Co., Detroit, Mich.

### **Boring Machines**

Ex-Cell-O Corp., Detroit, Mich.

R & L Tools, Philadelphia, Pa.

### **Brakes, Hand and Power**

Dreis & Krump Mfg. Co., 7440 So. Loomis Blvd., Chicago, Ill.

Verson Alsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

### **Brazers, Electric**

Grob Brothers, Grafton, Wis.

Oliver Machinery Co., Grand Rapids, Mich.

### **Broaching Machine Tools**

Colonial Broach Co., Detroit, Mich.

### **Broach Sharpening Machines**

Colonial Broach Co., Detroit, Mich.

### **Broaches, Spline and Square**

Colonial Bushings Co., Detroit, Mich.

Ex-Cell-O Corp., Detroit, Mich.

Taylor Machine Co., Cleveland, Ohio

### **Buffers, Bench**

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Vonnegut Moulder Corp., Indianapolis, Ind.

### **Buffers, Pedestal**

Vonnegut Moulder Corp., Indianapolis, Ind.

### **Bushings, Jig**

Acme Industrial Co., 210 N. Lafin St., Chicago

Colonial Bushings Co., Detroit, Mich.

Ex-Cell-O Corp., Detroit, Mich.

### **Bushings, Steel**

Acme Industrial Co., 210 N. Lafin St., Chicago  
E. A., 1812 So. Kilbourne Ave., Chicago, Ill.

### **Cable, Welding**

Lincoln Electric Co., Cleveland, Ohio

### **Calipers**

Comet Tools, Inc., 39 Union Square, New York  
Scherr Co., George, 122 Lafayette St., N. York

### **Carbs, Alloy Steel**

Modern Collet & Machine Co., Ecorse, Mich.

### **Cap Screws**

Triplex Screw Co., Cleveland, Ohio

### **Center Points**

Ford Motor Co., Johansson Div., Dearborn, Mich.

### **Centering Machines**

Cullman Wheel Co., 1359 Altgeld St., Chicago  
Sundstrand Machine Tool Co., Rockford, Ill.

### **Centers, Lathe**

Modern Machine Corp., Brooklyn, N. Y.

### **Chains, Silent and Roller**

Cullman Wheel Co., 1359 Altgeld St., Chicago

### **Chamfering Machines, Automatic**

Grant Mfg. & Machine Co., Bridgeport, Conn.

### **Chaser Grinders**

National Acme Co., Cleveland, Ohio

### **Chuckling Fingers**

Modern Collet & Machine Co., Ecorse, Mich.

Morrison Machine Products Div., Elmira, N. Y.

## Buyers' Directory

### **Chucking Machines**

National Acme Co., Cleveland, Ohio

### **Chucks, Air**

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

### **Chucks, Automatic**

Procurier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.

### **Chucks, Collet**

Hardinge Brothers, Inc., Elmira, N. Y.;  
Procurier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.

### **Chucks, Drill and Tap**

Errington Mech. Labor., Staten Island, N. Y.;  
Hartford Special Mach'y Co., Hartford, Conn.;  
Procurier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.;  
Scully-Jones & Co., 1905 S. Rockwell, Chicago

### **Chucks, Lathe**

L-W Chuck Co., Toledo, Ohio

### **Chucks, Magnetic**

Brown & Sharpe Mfg. Co., Providence, R. I.

### **Chucks, Quick Change**

Procurier Safety Chuck Co., 14 So. Clinton St., Chicago, Ill.

### **Clamping Devices, Air Operated**

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

### **Clutches, Friction**

Conway Clutch Co., Cincinnati, Ohio

### **Collets and Feed Fingers**

Morrison Machine Products Div., Elmira, N. Y.

### **Collets for all Lathes and Millers**

Hardinge Brothers, Inc., Elmira, N. Y.;  
Modern Collet & Machine Co., Ecorse, Mich.;  
Sutton Tool Co., Detroit, Mich.

### **Collet Tubes**

Modern Collet & Machine Co., Ecorse, Mich.;  
Sutton Tool Co., Detroit, Mich.

### **Comparators**

Federal Products Corp., Providence, R. I.

### **Contract Work Wanted**

Burke Machine Tool Co., Conneaut, Ohio

### **Counterbores**

Ex-Cell-O Corp., Detroit, Mich.;  
Scully-Jones & Co., 1905 S. Rockwell, Chicago

### **Countersinks**

Severance Tool Mfg. Co., Saginaw, Mich.

### **Couplings, Belt**

Armstrong-Bray & Co., 315 N. Loomis, Chicago

### **Couplings, Compression Shaft**

W. H. Nicholson & Co., Wilkes-Barre, Pa.

### **Couplings, Flexible**

Lovejoy Flex. Coupling Co., 5026 Lake, Chicago  
W. H. Nicholson & Co., Wilkes-Barre, Pa.

### **Couplings, Friction Clutch**

Conway Clutch Co., Cincinnati, Ohio

### **Couplings, Shaft**

W. H. Nicholson & Co., Wilkes-Barre, Pa.

### **Cut-off Saws**

Oliver Machinery Co., Grand Rapids, Mich.;  
Tannevits Works, Grand Rapids, Mich.

### **Cutter Grinders**

Gorton Machine Co., Geo., Racine, Wis.

Oliver Instrument Co., Adrian, Mich.

### **Cutters**

Progressive Tool & Cutter Co., Ferndale, Mich.;  
Putnam Tool Co., Detroit, Mich.

### **Cutters, Ball Socket**

Severance Tool Mfg. Co., Saginaw, Mich.

### **Cutters, Midget Milling**

Severance Tool Mfg. Co., Saginaw, Mich.

### **Cutters, Milling**

Brown & Sharpe Mfg. Co., Providence, R. I.;  
Ex-Cell-O Corp., Detroit, Mich.;  
Machinists Tool Grinding Co., 2834 W. Lake St.,  
Chicago, Ill.

Renu Tool Company, Detroit, Mich.

Scully-Jones & Co., 1905 S. Rockwell, Chicago;  
Wiley's Carbide Tool Co., Detroit, Mich.

### **Cutters, Gear**

Michigan Tool Co., Detroit, Mich.

### **Cutters, Taper Reaming**

Severance Tool Mfg. Co., Saginaw, Mich.

### **Cutters, Tube Burring**

Severance Tool Mfg. Co., Saginaw, Mich.

### **Cylinders, Air**

Hanna Engineering Works, 1763 Elston, Chicago;  
Hannifin Mfg. Co., 621 S. Kolmar, Chicago

### **Demagnetizers**

Electro-Matic Products Co., 4820 Deming Place,  
Chicago, Ill.

Luma Electric Equipment Co., Toledo, Ohio

L-W Chuck Co., Toledo, Ohio

Printz Electric Co., Detroit, Mich.

Victor Machinery Co., 130 S. Clinton St., Chicago, Ill.

### **Dies, Automatic Self-Opening**

National Acme Company, Cleveland, Ohio

### **Dies, Blank and Forming**

American Tool Works, Inc., Hartford, Conn.;  
Hamilton Tool Company, Hamilton, Ohio;  
Hovis Screwlock Co., Detroit, Mich.

### **Die Casting Machines**

Madison-Kipp Corporation, Madison, Wis.

### **Die Cushions**

Dayton Rogers Mfg. Co., Minneapolis, Minn.

### **Die Duplicating Machines**

Gorton Machine Co., Geo., Racine, Wis.;  
Madison-Kipp Corporation, Madison, Wis.

### **Die Fillers**

Continental Machine Specialties, Minneapolis

Grob Brothers, Grafton, Wis.

Harvey Mfg. Co., 161 Grand St., New York

Oliver Instrument Co., Adrian, Mich.

Oliver Machinery Co., Grand Rapids, Mich.

Pratt & Whitney, Hartford, Conn.

### **Die Making Machines**

Anglo Co., Milwaukee, Wis.

Continental Machine Specialties, Minneapolis

Grob Brothers, Grafton, Wis.

Harvey Mfg. Co., 161 Grand St., New York

Oliver Instrument Co., Adrian, Mich.

Oliver Machinery Co., Grand Rapids, Mich.

Pratt & Whitney, Hartford, Conn.

### **Die Makers' Supplies**

Cerro de Pasco Copper Corp., 44 Wall St., New York, N. Y.

Dayton Rogers Mfg. Co., Minneapolis, Minn.

### **Die Sets**

Baumbach Mfg. Co., E. A., 1812 So. Kilbourne Ave., Chicago, Ill.

## Buyers' Directory

**Dies, Hole Punching**  
Strippit Corp., Buffalo, N. Y.

**Dies, Notching**  
Strippit Corp., Buffalo, N. Y.

**Dividing Heads**  
Wm. Carroll & Son, Norwood, Cincinnati, O.  
L-W Chuck Co., Toledo, Ohio

**Dowel Pins, Steel**  
Acme Industrial Co., 210 N. Laflin St., Chicago  
Baumbach Mfg. Co., E. A., 1812 So. Kilbourne  
Ave., Chicago, Ill.

**Dressing Tools**  
Willey's Carbide Tool Co., Detroit, Mich.

**Drill Bushings**  
Acme Industrial Co., 210 N. Laflin St., Chicago  
Universal Eng. Corp., Frankenmuth, Mich.

**Drills, Electric**  
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.  
Stanley Electric Tool Div., New Britain, Conn.

**Drill Grinders**  
Black Diamond Saw & Machine Works, Inc.,  
Natick, Mass.  
Gallmeyer & Livingston Co., Grand Rapids,  
Mich.  
Oliver Instrument Co., Adrian, Mich.

**Drilling Machines, Bench**  
Atlas Press Co., Kalamazoo, Mich.  
Ayer Mfg. Co., Chicago Heights, Ill.  
Buffalo Forge Company, Buffalo, N. Y.  
Burke Machine Tool Co., Conneaut, Ohio  
Delta Mfg. Co., Milwaukee, Wis.

**Drilling Machines, Multiple Spindle**  
Buffalo Forge Co., Buffalo, N. Y.  
Canedy-Otto Mfg. Co., Chicago Heights, Ill.

**Drilling Machines, Portable Electric**  
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.  
Strand Co., N. A., 5001 N. Wolcott St., Chicago

**Drilling Machines, Post**  
Buffalo Forge Co., Buffalo, N. Y.

**Drilling Machines, Spindleless**  
Atlas Press Co., Kalamazoo, Mich.  
Ayer Mfg. Co., Chicago Heights, Ill.  
Buffalo Forge Company, Buffalo, N. Y.  
Burke Machine Tool Co., Conneaut, Ohio  
Hamilton Tool Co., Hamilton, Ohio

**Drilling Machines, Wall Type**  
Ayer Mfg. Co., Chicago Heights, Ill.

**Drilling Machines, Vertical**  
Atlas Press Co., Kalamazoo, Mich.  
Buffalo Forge Company, Buffalo, N. Y.

**Drives, Lathes**  
Culman Wheel Co., 1350 Altgeld St., Chicago  
Hardinge Brothers, Inc., Elmira, N. Y.  
Powermaster, 25 E. Fourth St., New York, N. Y.  
Remco Products Corp., 110 S. Dearborn St.,  
Chicago, Ill.

**Elevating Tables**  
Hamilton Tool Company, Hamilton, Ohio

**Emery Wheel Dressers and Cutters**  
Western Tool & Mfg. Co., Springfield, Ohio

**End Mills**  
Progressive Tool & Cutter Co., Ferndale, Mich.  
Putnam Tool Co., Detroit, Mich.  
Reng Tool Company, Cincinnati, Ohio  
Willey's Carbide Tool Co., Detroit, Mich.

**Engraving Machines**  
Gorton Machine Co., Geo., Racine, Wis.

**Etching Machines, Electric**  
Luma Electric Equipment Co., Toledo, Ohio  
Printz Electric Co., Detroit, Mich.

**Exhaust Blowers**  
Buffalo Forge Company, Buffalo, N. Y.

**Experimental Work**  
American Tool Works, Inc., Hartford, Conn.

**Extractors, Tap**  
Walton Co., Hartford, Conn.

**Feed Fingers for Auto. Screw Machines**  
Modern Collet & Machine Co., Ecorse, Mich.  
Morrison Machine Products Div., Elmira, N. Y.  
Sutton Tool Co., Detroit, Mich.

**Files**  
Oliver Instrument Co., Adrian, Mich.

**Files, Rotary**  
Grobet File Corp. of America, 3 Park Place,  
New York, N. Y.  
Hamilton Tool Co., Hamilton, Ohio  
Jarvis Co., Charles L., Middletown, Conn.  
Pratt & Whitney Div., Hartford, Conn.  
Severance Tool Mfg. Co., Saginaw, Mich.

**Filing Machines**  
Continental Machine Specialties, Minneapolis  
Groh Brothers, Grafton, Wis.  
Harvey Mfg. Co., 161 Grand St., New York  
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Oliver Instrument Co., Adrian, Mich.

**Filing Room Equipment**  
Wardwell Manufacturing Co., Cleveland, Ohio

**Flangers, Hand and Power**  
Ward Machinery Co., 504 W. Washington, Chi-  
cago, Ill.

**Flexible Couplings**  
Lovejoy Flexible Coupling Co., 5026 Lake, Chgo.

**Flexible Shafts and Accessories**  
Haskins Co., R. G., 4654 W. Fulton, Chicago  
Jarvis Co., Charles L., Middletown, Conn.  
Mall Tool Co., 7742 S. Chicago Ave., Chicago  
Strand & Co., 5001 N. Wolcott, Chicago  
Wyzenbeek & Staff, Inc., 838 W. Hubbard, Chgo.

**Flexible Shaft Couplings**  
Lovejoy Flexible Coupling Co., 5026 Lake, Chgo.  
W. H. Nicholson & Co., Wilkes-Barre, Pa.

**Flexible Shaft Machinery**  
Haskins Co., R. G., 4654 W. Fulton, Chicago  
Jarvis Co., Charles L., Middletown, Conn.  
Mall Tool Co., 7742 S. Chicago Ave., Chicago  
Pratt & Whitney, Hartford, Conn.  
Strand & Co., 5001 N. Wolcott, Chicago  
Wyzenbeek & Staff, Inc., 838 W. Hubbard, Chgo.

**Flue Lathes**  
Marshalltown Mfg. Co., Marshalltown, Ia.

**Flue Welders**  
Marshalltown Mfg. Co., Marshalltown, Ia.

**Forgings, Hollow Bored**  
American Hollow Boring Co., Erie, Pa.

**Forming Tools**  
Michigan Tool Co., Detroit, Mich.  
Morrison Machine Products Div., Elmira, N. Y.

**Furniture, Machine Shop**  
Western Tool & Mfg. Co., Springfield, Ohio

## Buyers' Directory

### **Gages**

Federal Products Corp., Providence, R. I.  
 Ford Motor Co., Johansson Div., Dearborn, Mich.  
 Willey's Carbide Tool Co., Detroit, Mich.

### **Gages, Pin, Plug, Ring and Snap**

American Tool Works, Inc., Hartford, Conn.  
 Standard Gage Co., Poughkeepsie, N. Y.

### **Gages, Pressure**

Marshalltown Mfg. Co., Marshalltown, Ia.

### **Gages, Special**

Federal Products Corp., Providence, R. I.  
 Ford Motor Co., Johansson Div., Dearborn, Mich.  
 Standard Gage Co., Poughkeepsie, N. Y.  
 Starrett Co., L. S., Athol, Mass.

### **Gages, Taper**

Hartford Special Machinery Co., Hartford, Conn.

### **Gage Blocks, Precision**

Ford Motor Co., Johansson Div., Dearborn, Mich.

### **Gasoline Electric Light Plants**

Janette Mfg. Co., 556 W. Monroe St., Chicago

### **Gears**

Abart Gear & Mch. Co., 4832 W. 16th St., Chgo.  
 Taylor Machine Co., Cleveland, Ohio

### **Generators**

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.  
 Janette Mfg. Co., 552 W. Monroe St., Chicago

### **Grinders, Air**

M-B Products, Detroit, Mich.  
 Madison-Kipp Corporation, Madison, Wis.

### **Grinders, Bench**

Baldor Electric Co., St. Louis, Mo.  
 Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
 Stanley Electric Tool Div., New Britain, Conn.  
 Vonnegut Moulder Corp., Indianapolis, Ind.

### **Grinders, Disc**

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
 Oliver Machinery Co., Grand Rapids, Mich.  
 Wyzenbeek & Staff, Inc., 838 W. Hubbard, Chgo.

### **Grinders, External**

F. A. Maxwell Co., Bedford, Ohio

### **Grinders, Flexible Shaft**

Haskins Co., R. G., 4654 Fulton St., Chicago  
 Jarvis Co., Charles L., Middletown, Conn.  
 Mall Tool Co., 7742 S. Chicago Ave., Chicago  
 Stanley Electric Tool Div., New Britain, Conn.  
 N. A. Strand Co., 5001 N. Wolcott, Chicago

### **Grinders, Hand**

Chicago Wheel & Mfg. Co., 1101 W. Monroe St.,  
 Chicago, Ill.  
 Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
 M-B Products Co., Detroit, Mich.  
 Skilsaw, Inc., 3304 Elston Ave., Chicago, Ill.

### **Grinders, Heavy Duty**

Vonnegut Moulder Corp., Indianapolis, Ind.

### **Grinders, High Speed**

Bridgeport Pattern & Model Works, Bridgeport,  
 Conn.  
 Chicago Wheel & Mfg. Co., 1101 W. Monroe  
 St., Chicago, Ill.  
 Jarvis Co., Charles L., Middletown, Conn.  
 Mall Tool Co., 7742 S. Chicago Ave., Chicago  
 M-B Products, Detroit, Mich.

### **Grinders, Internal**

F. A. Maxwell Co., Bedford, Ohio

### **Grinders, Pedestal Electric**

Baldor Electric Co., St. Louis, Mo.

### **Grinders, Swing Frame**

Vonnegut Moulder Corp., Indianapolis, Ind.

### **Grinders, Valve**

F. A. Maxwell Co., Bedford, Ohio

### **Grinders and Polishers, Belt**

Oliver Machinery Co., Grand Rapids, Mich.

### **Grinding Attachments, Drill**

Atlas Press Co., Kalamazoo, Mich.  
 Carlson Mfg. Co., C. H., Minneapolis, Minn.  
 Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
 Oliver Instrument Co., Adrian, Mich.

### **Grinding Attachments, Contract**

Commercial Centerless Grinding Co., 6538 Carnegie Ave., Cleveland, Ohio  
 Ertel Machine Co., Indianapolis, Ind.  
 Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.

### **Grinding Compound**

Timesaver Products Co., 33 S. Desplaines St., Chicago, Ill.

### **Grinding Machine Attachments**

Berkeley Engineering Co., Cleveland, Ohio

### **Grinding Machines, Belt**

Armco Co., Milwaukee, Wis.  
 Walls Sales Corp., 96 Warren St., New York

### **Grinding Machines, Cutter, Beamer and Tool**

Brown & Sharpe Mfg. Co., Providence, R. I.  
 Gallmeyer & Livingston Co., Grand Rapids, Mich.  
 National Machine Tool Co., Racine, Wis.  
 Oliver Instrument Co., Adrian, Mich.  
 Prosser & Son, 120 Wall St., New York, N. Y.  
 Rogers & Co., Buffalo, N. Y.

### **Grinding Machines, Internal**

National Machine Tool Co., Racine, Wis.

### **Grinding Machines, Portable Electric**

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.  
 Haskins Co., R. G., 4654 W. Fulton, Chicago  
 Jarvis Co., Charles L., Middletown, Conn.  
 Mall Tool Co., 7742 S. Chicago Ave., Chicago  
 National Machine Tool Co., Racine, Wis.  
 Pratt & Whittney, Hartford, Conn.  
 Strand Co., N. A., 5001 N. Wolcott St., Chicago

### **Grinding Machines, Surface**

Gallmeyer & Livingston Co., Grand Rapids, Mich.

### **Grinding Machines, Tap**

Gallmeyer & Livingston Co., Grand Rapids, Mich.  
 Oliver Instrument Co., Adrian, Mich.

### **Grinding Machines, Tool**

Prosser & Son, 120 Wall St., New York, N. Y.  
 Rogers & Co., Buffalo, N. Y.

### **Grinding Machines, Universal**

Brown & Sharpe Mfg. Co., Providence, R. I.

### **Grinding Service**

Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.

### **Grinding Spindles**

Ex-Cell-O Corp., Detroit, Mich.

## Buyers' Directory

### **Grinding Wheels**

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.  
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

### **Hack Saw Blades**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
Starrett Co., L. S., Athol, Mass.

### **Hack Saw Machines**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
L-W Chuck Co., Toledo, Ohio  
Wells Mfg. Corp., Three Rivers, Mich.

### **hammers, Portable Electric**

Stanley Electric Tool Div., New Britain, Conn.

### **hammers, Soft Faced**

Greene Tweed & Co., 100 Duane St., New York

### **Hand Saws, Portable Electric**

Skinsaw, Inc., 3304 Elston Ave., Chicago, Ill.

### **Hand Screw Machines, Precision**

Hardinge Brothers, Inc., Elmira, N. Y.

### **Heads, Boring**

Flynn Manufacturing Co., Detroit, Mich.

### **Hobs**

Michigan Tool Co., Detroit, Mich.

### **Hole Cutters**

Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

### **Index Centers**

Brown & Sharpe Mfg. Co., Providence, R. I.  
Wm. Carroll & Son, Norwood, Cincinnati, Ohio  
L-W Chuck Co., Toledo, Ohio

### **Indicators, Dial**

Federal Products Corp., Providence, R. I.  
Standard Gage Co., Inc., Poughkeepsie, N. Y.  
Starrett Co., L. S., Athol, Mass.

### **Indicators, Speed**

Greene Tweed & Co., 100 Duane St., New York  
Starrett Co., L. S., Athol, Mass.

### **Indicators, Surface Test**

Federal Products Corp., Providence, R. I.  
Reich Mfg. Co., J. R., Dayton, Ohio  
Starrett Co., L. S., Athol, Mass.

### **Jigs and Fixtures**

American Tool Works, Inc., Hartford, Conn.  
Hamilton Tool Company, Hamilton, Ohio  
Hartford Special Machinery Co., Hartford, Conn.

### **Keysetting Machines**

Burr & Son, John T., Brooklyn, N. Y.

### **Knife Grinders**

Rogers & Co., Buffalo, N. Y.

### **Lapping Compound**

Timesaver Products Co., 33 S. Desplaines St.,  
Chicago, Ill.

### **Lathe Centers**

Modern Machine Corp., Brooklyn, N. Y.

### **Lathe Drives**

Berkeley Engineering Co., Cleveland, Ohio  
Cullinan Wheel Co., 1339 Altgeld St., Chicago  
Hardinge Brothers, Inc., Elmira, N. Y.

### **Lathe, Back Geared**

Atlas Press Co., Kalamazoo, Mich.  
Rivett Lathe & Grinder, Inc., Brighton, Boston  
South Bend Lathe Works, South Bend, Ind.

### **lathes, Bench**

Atlas Press Co., Kalamazoo, Mich.  
Delta Mfg. Co., Milwaukee, Wis.  
Hardinge Brothers, Inc., Elmira, N. Y.  
Rivett Lathe & Grinder, Inc., Brighton, Boston  
Sheldon Machine Co., 3257 Cottage Grove Ave.,  
Chicago, Ill.  
South Bend Lathe Works, South Bend, Ind.

### **lathes, Brake Drum**

South Bend Lathe Works, South Bend, Ind.

### **lathes, Engine**

South Bend Lathe Works, South Bend, Ind.

### **lathes, Manufacturing**

Sundstrand Machine Tool Co., Rockford, Ill.

### **lathes, Screw Cutting**

Atlas Press Co., Kalamazoo, Mich.  
Hardinge Brothers, Inc., Elmira, N. Y.  
South Bend Lathe Works, South Bend, Ind.

### **lathes, Speed**

Schauer Machine Co., Cincinnati, Ohio

### **lathes, Toolroom**

Atlas Press Co., Kalamazoo, Mich.  
Hardinge Brothers, Inc., Elmira, N. Y.  
South Bend Lathe Works, South Bend, Ind.

### **Layout Fluid**

Dayton Rogers Mfg. Co., Minneapolis, Minn.  
Michigan Chrome Company, Detroit, Mich.

### **Layout Plates**

Busch Co., J. C., Milwaukee, Wis.  
Challenge Machinery Co., Grand Haven, Mich.

### **Leader Pins, Steel**

Acme Industrial Co., 210 Lafin St., Chicago, Ill.

### **Leather Oil Retainers**

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

### **Live Lathe Centers**

Modern Machine Corp., Brooklyn, N. Y.

### **Lock Forming Machines, Power**

Ward Machinery Co., 564 W. Washington, Chi-  
cago, Ill.

### **Lubricators, Air**

Norgren, C. A., Denver, Colorado

### **Lubricators, Automatic**

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago  
Greene Tweed & Co., 100 Duane St., New York  
Madison-Kipp Corporation, Madison, Wis.  
M-B Products Co., Detroit, Mich.  
Norgren Co., C. A., Denver, Colorado

### **Lubricators, Engine**

Madison-Kipp Corporation, Madison, Wis.

### **Magnetic Chuck Demagnetizers**

Electro-Matic Products Co., 4820 Deming Place,  
Chicago, Ill.

### **Mandrels, Expanding**

W. H. Nicholson & Co., Wilkes-Barre, Pa.  
Western Tool & Mfg. Co., Springfield, Ohio

### **Marking Machines**

Schmidt, Geo. T., Inc., 1802 Belle Plaine Ave.,  
Chicago, Ill.

## Buyers' Directory

### **Milling Attachments**

Bridgeport Pattern & Model Works, Bridgeport, Conn.

Brown & Sharpe Mfg. Co., Providence, R. I.  
Burke Machine Tool Co., Conneaut, Ohio  
Wm. Carroll & Son, Norwood, Cincinnati, Ohio  
Kearney & Trecker Corp., Milwaukee, Wis.

### **Milling Machine Attachments**

Berkeley Engineering Co., Cleveland, Ohio

### **Milling Machines, Bench**

Burke Machine Tool Co., Conneaut, Ohio  
Hardinge Brothers, Inc., Elmira, N. Y.  
Sundstrand Machine Tool Co., Rockford, Ill.

### **Milling Machines, Hand**

Burke Machine Tool Co., Conneaut, Ohio  
Sundstrand Machine Tool Co., Rockford, Ill.

### **Milling Machines, Plain**

Brown & Sharpe Mfg. Co., Providence, R. I.  
Burke Machine Tool Co., Conneaut, Ohio  
Kearney & Trecker Corp., Milwaukee, Wis.  
Sundstrand Machine Tool Co., Rockford, Ill.

### **Milling Machines, Universal**

Brown & Sharpe Mfg. Co., Providence, R. I.  
Gorton Machine Co., Geo., Racine, Wis.  
Kearney & Trecker Corp., Milwaukee, Wis.

### **Milling Machines, Vertical**

Blank Machinery, Jackson, Mich.  
Gorton Machine Co., Geo., Racine, Wis.  
Kearney & Trecker Corp., Milwaukee, Wis.

### **Motors**

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.  
Janette Mfg. Co., 552 W. Monroe St., Chicago

### **Motor-Generator Sets**

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.  
Janette Mfg. Co., 552 W. Monroe St., Chicago

### **Motor Drives, Universal**

Berkeley Engineering Co., Cleveland, Ohio  
Cullman Wheel Co., 1330 Altgeld St., Chicago  
Powermaster, 25 E. Fourth St., New York, N. Y.  
Remco Products Corp., 110 S. Dearborn St.,  
Chicago, Ill.

Turner Uni-Drive Co., Kansas City, Mo.

### **Motor Starters**

Lincoln Electric Co., Cleveland, Ohio

### **Moulds & Ladies Hammer and Vise**

Johnson Tool Co., East Providence, R. I.

### **Multiple Oilers**

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

### **Nibbling Machines**

National Machine Tool Co., Racine, Wis.

### **Oil Cups**

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

### **Oil Gauges**

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

### **Oil and Grease Seals**

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

### **Packings, Steam**

Greene Tweed & Co., 109 Duane St., New York

### **Parallels**

Ford Motor Co., Johansson Div., Dearborn, Mich.

### **Pins, Leader and Dowel**

Acme Industrial Co., 210 Laflin St., Chicago, Ill.  
Baumbach Mfg. Co., E. A., 1812 So. Kilbourne Ave., Chicago, Ill.

### **Pipe Cutters**

Ridge Tool Co., Elyria, Ohio

### **Pipe Vises**

Ridge Tool Co., Elyria, Ohio

### **Pipe Wrenches**

Ridge Tool Co., Elyria, Ohio

### **Point Thinning Machines**

Oliver Instrument Co., Adrian, Mich.

### **Press Brakes**

Dreis & Krump Mfg. Co., 7440 Loomis Blvd.,  
Chicago, Ill.  
Verson Allsteel Press Co., 9303 S. Kenwood Ave.,  
Chicago, Ill.  
Ward Machinery Co., 564 W. Washington, Chi-  
cago, Ill.

### **Press Feeds**

Littell Machine Co., F. J., 4153 Ravenswood  
Ave., Chicago, Ill.  
Witteke Mfg. Co., 4300 W. 24th Place, Chicago

### **Presses, Arbor**

Atlas Press Co., Kalamazoo, Mich.  
Greenerd Arbor Press Co., Nashua, N. H.  
Hanna Engineering Works, 1763 Elston, Chicago  
Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.  
W. H. Nicholson & Co., Wilkes-Barre, Pa.  
Sheldon Machine Co., 3257 Cottage Grove Ave.,  
Chicago, Ill.  
Wilson, K. E., Buffalo, N. Y.

### **Presses, Bench**

Atlas Press Co., Kalamazoo, Mich.

### **Presses, Broaching**

Greenerd Arbor Press Co., Nashua, N. H.

### **Presses, Foot**

Ward Machinery Co., 564 W. Washington, Chi-  
cago, Ill.

### **Presses, Forming**

Marshalltown Mfg. Co., Marshalltown, Ia.

### **Presses, Hydraulic**

Atlas Press Co., Kalamazoo, Mich.  
Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

### **Presses, Inclinable**

Federal Press Co., Elkhart, Indiana.  
Marshalltown Mfg. Co., Marshalltown, Ia.

### **Presses, Power**

Dreis & Krump Mfg. Co., 7440 Loomis Blvd.,  
Chicago, Ill.  
Federal Press Co., Elkhart, Indiana.  
Verson Allsteel Press Co., 9303 S. Kenwood Ave.,  
Chicago, Ill.

### **Presses, Punch**

Dreis & Krump Mfg. Co., 7440 Loomis Blvd.,  
Chicago, Ill.  
Lowthwaite Machine Co., 311 E. 47th St., New  
York, N. Y.  
Marshalltown Mfg. Co., Marshalltown, Ia.

### **Presses, Sheet Metal**

Federal Press Co., Elkhart, Indiana

### **Presses, Steel**

Verson Allsteel Press Co., 9303 S. Kenwood Ave.,  
Chicago, Ill.

**Buyers' Directory****Profiling Machines**

Gorton Machine Co., Geo., Racine, Wis.  
Oliver Instrument Co., Adrian, Mich.

**Pulleys, Steel and Wood**

Delta Mfg. Co., Milwaukee, Wis.

**Pumps**

Brown & Sharpe Mfg. Co., Providence, R. I.  
Galland-Henning Mfg. Co., Milwaukee, Wis.

**Pumps, Coolant**

Ruthman Machinery Co., Cincinnati, Ohio  
Tomkins-Johnson Co., Jackson, Mich.

**Pumps, Lubricant**

Ruthman Machinery Co., Cincinnati, Ohio

**Punch, Shear and Bender, Hand**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
Buffalo Forge Co., Buffalo, N. Y.

**Punch Retainers**

Hovis Screwlock Co., Detroit, Mich.

**Punches and Dies**

Hovis Screwlock Co., Detroit, Mich.  
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

**Punches, Hand**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
Buffalo Forge Company, Buffalo, N. Y.  
Hovis Screwlock Co., Detroit, Mich.  
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.  
Ward Machinery Co., 564 W. Washington, Chicago, Ill.  
Whitney Metal Tool Co., Rockford, Ill.

**Quick Change Collets & Chucks**

Jarvis Co., Charles L., Middletown, Conn.

**Racks, Bar Stock**

Western Tool & Mfg. Co., Springfield, Ohio  
Wm. S. Yohe Supply Co., Canton, Ohio

**Reamers**

Renu Tool Company, Detroit, Mich.

**Rivets, Tubular and Split**

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O., Chicago, Ill.

**Riveters, Automatic Feed**

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O., Chicago, Ill.

**Riveters, "Hy-Power" Hydraulic**

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

**Riveters, Multiple Spindle**

Grant Mfg. & Machine Co., Bridgeport, Conn.

**Riveters, Pneumatic**

Grant Mfg. & Machine Co., Bridgeport, Conn.  
Hanna Engineering Works, 1763 Elston Ave., Chicago, Ill.

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

**Riveting Machines**

Buffalo Forge Co., Buffalo, N. Y.  
Grant Mfg. & Machine Co., Bridgeport, Conn.  
Hanna Engineering Works, 1763 Elston Ave., Chicago, Ill.  
Linley Bros. Co., Bridgeport, Conn.

**Riveting Machines, Tubular and Split**

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O., Chicago, Ill.

**Rod Cutters**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

**Rotary Converters**

Janette Mfg. Co., 556 W. Monroe St., Chicago

**Rotary Files**

Grobet File Corp. of America, 3 Park Place, New York, N. Y.  
Hamilton Tool Co., Hamilton, Ohio  
Jarvis Co., Charles L., Middletown, Conn.  
Pratt & Whitney Div., Hartford, Conn.

**Router Bits**

Putnam Tool Co., Detroit, Mich.

**Sanders**

Jarvis Co., Charles L., Middletown, Conn.  
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Stanley Electric Tool Div., New Britain, Conn.

**Saws**

Black Diamond Saw & Machine Works, Inc., Natick, Mass.

**Saws, Electric Hand**

Delta Mfg. Co., Milwaukee, Wis.  
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Stanley Electric Tool Div., New Britain, Conn.

**Saws, Rotary Hack**

Stanley Electric Tool Div., New Britain, Conn.

**Saw Sharpening Machines**

Rogers & Co., Buffalo, N. Y.  
Wardwell Manufacturing Co., Cleveland, Ohio

**Sawing Machines**

Continental Machine Specialties, Minneapolis  
Delta Mfg. Co., Milwaukee, Wis.  
Groh Brothers, Grafton, Wis.  
Wells Mfg. Co., Three Rivers, Mich.

**Scraping Machines, Hand & Pneumatic**

Anderson Bros. Mfg. Co., Rockford, Ill.

**Screw Drivers, Electric**

Haskins Co., R. G., 4654 W. Fulton, Chicago  
Jarvis Co., Charles L., Middletown, Conn.  
Stanley Electric Tool Div., New Britain, Conn.

**Screw Machine Parts**

Modern Collet & Machine Co., Ecorse, Mich.  
Sutton Tool Company, Detroit, Mich.

## Buyers' Directory

### **Screw Machine Products**

Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.  
National Acme Company, Cleveland, Ohio

### **Screw Machines, Automatic**

Brown & Sharpe Mfg. Co., Providence, R. I.  
National Acme Company, Cleveland, Ohio

### **Scribers**

Ford Motor Co., Johansson Div., Dearborn, Mich.  
Starrett Co., L. S., Athol, Mass.

### **Set Screws, Headless and Hollow**

Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.

Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.

Triplex Screw Co., Cleveland, Ohio

### **Set-Up Appliances**

Standard Shop Equipment Co., Inc., Phila., Pa.

### **Shafts, Flexible**

R. G. Haskins Co., 4654 W. Fulton St., Chicago  
Jarvis Co., Charles L., Middletown, Conn.  
Mail Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Pratt & Whitney, Hartford, Conn.  
Strand Co., N. A., 5001 N. Wolcott St., Chicago

### **Shafts, Hangers & Boxes**

Delta Mfg. Co., Milwaukee, Wis.

### **Shafts, Steel**

American Hollow Boring Co., Erie, Pa.

### **Shapers**

Atlas Press Co., Kalamazoo, Mich.

### **Shaping Machines**

Osborne & Sexton Machinery Co., Columbus, O.

### **Shears, Bevel**

Marshalltown Mfg. Co., Marshalltown, Ia.  
Ward Machinery Co., 564 W. Washington, Chicago, Ill.

### **Shears, Electric**

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

### **Shears, Hand**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
Beverly Shear Co., 3007 W. 110th Pl., Chicago  
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.  
National Machine Tool Co., Racine, Wis.  
Whitney Metal Tool Co., Rockford, Ill.

### **Shears, Power**

Buffalo Forge Co., Buffalo, N. Y.  
Dreis & Krump Mfg. Co., 7440 Loomis, Chicago  
Stanley Electric Tool Div., New Britain, Conn.  
Ward Machinery Co., 564 W. Washington, Chicago, Ill.

### **Shears, Slitting**

Beverly Shear Co., 3007 W. 110th Pl., Chicago  
Buffalo Forge Co., Buffalo, N. Y.  
Dreis & Krump Mfg. Co., 7440 Loomis, Chicago  
National Machine Tool Co., Racine, Wis.

### **Shears, Splitting**

Marshalltown Mfg. Co., Marshalltown, Ia.

### **Shears, Throatless**

Beverly Shear Co., 3007 W. 110th Pl., Chicago  
Marshalltown Mfg. Co., Marshalltown, Ia.

### **Sheet Metal Working Machinery**

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

### **Shelving, Steel**

Interior Steel Equipment Co., Cleveland, Ohio

### **Sine Bars**

Ford Motor Co., Johansson Div., Dearborn, Mich.

### **Socket Head Cap Screws**

Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.  
Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.

### **Spacing Collars**

Scully-Jones & Co., 1905 S. Rockwell, Chicago

### **Special Tools and Machinery**

American Tool Works, Inc., Hartford, Conn.

### **Speed Reducers**

Abart Gear & Mchne. Co., 4832 W. 16th St., Chgo.  
Armuglo Co., Milwaukee, Wis.  
Culiman Wheel Co., 1359 Altgeld St., Chicago  
Janette Mfg. Co., 562 W. Monroe St., Chicago

### **Speed Saws, Universal**

Wyzenbeek & Staff, Inc., 838 W. Hubbard, Chgo.

### **Spinning Lathes, Metal**

Oliver Machinery Co., Grand Rapids, Mich.

### **Spools & Nuts for Auto. Screw Machines**

Sutton Tool Co., Detroit, Mich.

### **Split Rivets**

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O., Chicago, Ill.

### **Split Rivet Setters, Automatic Feed**

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O., Chicago, Ill.

### **Spot Welding Machines, Speed**

Armuglo Co., Milwaukee, Wis.  
Eiseler Engineering Co., Inc., Newark, N. J.  
Interstate Machinery Co., Chicago, Ill.  
Pier Equipment Mfg. Co., Benton Harbor, Mich.

### **Sprockets**

Culiman Wheel Co., 1359 Altgeld St., Chicago

### **Stock Riveters**

Marshalltown Mfg. Co., Marshalltown, Ia.

### **Stampings**

Hamilton Tool Co., Hamilton, Ohio

### **Steel Stamps**

Colonial Bushings Co., Detroit, Mich.

### **Stop Watches**

Meylan, A. R. & J. E., 268 W. 40th St., N.Y.C.

### **Storage Racks**

Interior Steel Equipment Co., Cleveland, Ohio  
Stackbin Corp., Providence, R. I.

Yohé Supply Co., Canton, Ohio

### **Straight Edges**

Ford Motor Co., Johansson Div., Dearborn, Mich.

### **Straightening Machines**

Whitney Metal Tool Co., Rockford, Ill.

### **Stripping Units**

Strippit Corp., Buffalo, N. Y.

### **Studs, Milled**

Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.

### **Tap Extractors**

Walton Co., Hartford, Conn.

## Buyers' Directory

### **Tap Holders**

Procurier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.  
Scully-Jones & Co., 1905 S. Rockwell, Chicago

### **Tapes, Steel**

Starrett Co., L. S., Athol, Mass.

### **Tapping Machines and Attachments**

Burke Machine Tool Co., Conneaut, Ohio  
Errington Mechanical Laboratories, Staten Island, N. Y.  
Haskins Co., R. G., 4654 W. Fulton St., Chicago  
Jarvis Co., Charles L., Middletown, Conn.  
Procurier Safety Chuck Co., 14 So. Clinton St., Chicago, Ill.  
Whitney Metal Tool Co., Rockford, Ill.

### **Taps, Collapsing**

National Acme Company, Cleveland, Ohio

### **Thread Grinders**

Ex-Cell-O Corp., Detroit, Mich.

### **Threading Machines, Automatic**

Grant Mfg. & Machine Co., Bridgeport, Conn.

### **Threading Tools**

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.  
Ridge Tool Co., Elyria, Ohio  
Rivett Lathe & Grinder, Inc., Brighton, Boston

### **Timing Instruments**

Meylan, A.R. & J.E., 266 W. 40th St., N. Y. C.

### **Tool Heads, Universal**

Precision Tool Co., Bridgeport, Conn.

### **Tool Holders**

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.  
Michigan Tool Co., Detroit, Mich.  
Presto Tool Mfg. Co., Detroit, Mich.  
Western Tool & Mfg. Co., Springfield, Ohio

### **Tool Post Turrets**

Colwell, S. G., Providence, R. I.

### **Tool Reclaiming**

Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.

Renu Tool Company, Detroit, Mich.

### **Tool Salvage**

Renu Tool Company, Detroit, Mich.

### **Tools, Boring**

Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.  
Comet Tools, Inc., 39 Union Square, New York

### **Tools, Lathe and Planer**

Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.

### **Tools, Machinists'**

Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.

Brown & Sharpe Mfg. Co., Providence, R. I.

### **Tram Points**

Ford Motor Co., Johansson Div., Dearborn, Mich.

### **Transfer Punches**

McMahon Co., Frank, Dayton, Ohio

### **Tube Flanging Machines**

Grant Mfg. & Mch. Co., Bridgeport, Conn.

### **Tubular Rivet Setters, Automatic Feed**

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

### **Tungsten Carbide Tools**

Metal Carbides Corp., Youngstown, Ohio  
Michigan Tool Co., Detroit, Mich.  
Wiley's Carbide Tool Co., Detroit, Mich.

### **Turning Tools**

R & L Tools, Philadelphia, Pa.

### **Universal Joints**

American Tool Works, Inc., Hartford, Conn.

### **Used and Rebuilt Machinery**

Aaron Machinery Co., 176 Lafayette St., N. Y.  
Belyea Co., Inc., 150 W. 18th St., New York  
Bennet-Rafkin Machine Tool Corp., 30 Church St., New York, N. Y.  
Bernstein & Co., Geo. M., 12 S. Clinton, Chgo.  
Bleser Mfg. & Mch. Co., Springfield, Ill.  
Botwinik Brothers, New Haven, Conn.  
Brown Machinery Co., St. Louis, Mo.  
Cincinnati Machinery & Supply Co., Cincinnati, O.  
Clinton Machinery Co., 33 S. Clinton St., Chicago  
Durham Mfg. Co., Muncie, Ind.  
Eastern Machinery Co., Cincinnati, Ohio  
Emerson, Louis E. & Co., 1761 Elston, Chicago  
Easley Machinery Co., E. L., 831 W. Evergreen Ave., Chicago, Ill.  
Falk Mill Supply Co., Inc., Rochester, N. Y.  
Fuchs Mch. & Supply Co., Omaha, Nebr.  
General Blower Co., 401 N. Peoria St., Chicago  
General Machinery Corp., Boston, Mass.  
Hackett Co., J. Lee, Detroit, Mich.  
Hazard Brownell, Providence, R. I.  
Hill, Clarke & Co., 645 W. Washington, Chgo.  
Hyman & Sons, Joseph, Philadelphia, Pa.  
Indianapolis Mch. & Supply Co., Indianapolis  
Industrial Machinery Co., Indianapolis, Ind.  
International Machinery Co., Detroit, Mich.  
Interstate Machinery Co., 109 S. Clinton, Chgo.  
Iroquois Machinery Co., Buffalo, N. Y.  
Johnson & Sons Mch. Co., Wm. C., St. Louis  
Jones Machine Tool Co., Cincinnati, Ohio  
Klauber Machinery Co., St. Louis, Mo.  
Lang Machinery Co., Pittsburgh, Pa.  
Lucas & Son, Bridgeport, Conn.  
McDonald Machinery Co., St. Louis, Mo.  
Marr-Galbreath Mch. Co., Pittsburgh, Pa.  
Midwest Equipment Co., 628 W. Lake, Chicago  
Miles Machinery Co., Saginaw, W. B., Mich.  
Morey Machinery Co., Inc., 410 Broome St., New York, N. Y.

Nelson Machinery Co., Green Bay, Wis.  
Norton-Broadway Machinery Co., Cincinnati, O.  
Nutmeg State Mch. Corp., New Haven, Conn.  
O'Brien Machinery Co., Philadelphia, Pa.  
Osborne & Sexton Machinery Co., Columbus, O.  
Ott Machinery Sales Co., Detroit, Mich.  
Prutton Machinery Co., D. H., Cleveland, Ohio  
Reliance Machinery Sales Co., Pittsburgh, Pa.

## Buyers' Directory

**Used and Rebuilt Machinery—Cont.**

Rosenkranz & Weisbecker, 2309-A Singer Bldg., New York City  
 Scott-Bansbach Mchly. Co., 4607 W. 20th, Chgo.  
 Segal Machinery Co., 117 S. Clinton St., Chicago Service Co., Cleveland, Ohio  
 Simmons Machine Tool Corp., Albany, N. Y.  
 Standard Machinery Co., Grand Rapids, Mich.  
 State Machinery Co., New Haven, Conn.  
 Strong, Carlisle & Hammond Co., Cleveland, O.  
 Surplus Stock & Mchly. Co., Inc., 618 W. Lake St., Chicago, Ill.  
**Travers Tool Co.**, 5 Court Square, Long Island City, N. Y.  
 United Machinery & Supply Co., St. Louis, Mo.  
 Victor Machinery Co., 130 S. Clinton, Chicago  
 Victor Machinery Exchange, 251 Centre St., New York, N. Y.  
 Vine, R. A., Detroit, Mich.  
 Wertman Machinery Co., Cleveland, Ohio  
 West Penn Machinery Co., Pittsburgh, Pa.  
 White Mchly. Co., A. D., 108 N. Jefferson, Chgo.  
 Wigglesworth Machinery Co., Cambridge, Mass.  
 Wolnick Mchly. Sales, 9 S. Clinton St., Chicago, Ill.

**Vacuum Cleaners, Industrial**

Breuer Electric Mfg. Co., 5108 N. Ravenswood Ave., Chicago, Ill.

**Vacuum Cleaners, Portable**

Breuer Electric Mfg. Co., 5108 N. Ravenswood Ave., Chicago, Ill.

**Valves, Air**

Air-Way Pump & Equipment Co., 617 W. Jackson, Chicago, Ill.  
 Galland-Henning Mfg. Co., Milwaukee, Wis.  
 Hanna Engineering Works, 1763 Elston, Chicago  
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago  
 Nicholson & Co., Wilkes-Barre, Penna.  
 Ross Operating Valve Co., Detroit, Mich.

**Valves**

Galland-Henning Mfg. Co., Milwaukee, Wis.  
 Hanna Engineering Works, 1763 Elston, Chicago  
 Ross Operating Valve Co., Detroit, Mich.

**Valves, Foot, Lever & Solenoid**

Hanna Engineering Works, 1763 Elston, Chicago  
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago  
 Nicholson & Co., W. H., Wilkes-Barre, Pa.  
 Ross Operating Valve Co., Detroit, Mich.

**Valves, Hydraulic**

Galland-Henning Mfg. Co., Milwaukee, Wis.  
 Hanna Engineering Works, 1763 Elston, Chicago  
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago  
 Nicholson & Co., Wilkes-Barre, Penna.

**Valves, Operating**

Galland-Henning Mfg. Co., Milwaukee, Wis.  
 Hanna Engineering Works, 1763 Elston, Chicago  
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago  
 Ross Operating Valve Co., Detroit, Mich.

**Vises, Drilling Machine**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
 Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.  
 Johnson Tool Co., Inc., East Providence, R. I.  
 L-W Chuck Co., Toledo, Ohio  
 National Machine Tool Co., Racine, Wis.  
 Odin Universal Corp., 110 S. Dearborn, Chicago  
 Plunket Machine Co., 1823 W. Lake St., Chicago  
 Sheldon Machine Co., 3257 Cottage Grove, Chgo.

**Vises, Machinists'**

L-W Chuck Co., Toledo, Ohio  
 Miller & Crowningshield, Greenfield, Mass.  
 Odin Universal Corp., 110 S. Dearborn, Chicago  
 Sheldon Machine Co., 3257 Cottage Grove, Chgo.  
 Western Tool & Mfg. Co., Springfield, Ohio

**Vises, Milling Machine**

Hartford Special Mchly. Co., Hartford, Conn.  
 L-W Chuck Co., Toledo, Ohio  
 Miller & Crowningshield, Greenfield, Mass.  
 Odin Universal Corp., 110 S. Dearborn, Chicago  
 Plunket Machine Co., 1823 W. Lake St., Chicago  
 Sheldon Machine Co., 3257 Cottage Grove, Chgo.

**Vises, Precision**

Odin Universal Corp., 110 S. Dearborn, Chicago

**Vises, Sharpen**

L-W Chuck Co., Toledo, Ohio  
 Odin Universal Corp., 110 S. Dearborn, Chicago  
 Plunket Machine Co., 1823 W. Lake St., Chicago  
 Sheldon Machine Co., 3257 Cottage Grove, Chgo.

**Welders, Arc**

Hobart Brothers, Troy, Ohio  
 Lincoln Electric Co., Cleveland, Ohio  
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

**Welders, Portable**

Hobart Brothers, Troy, Ohio

**Welding Accessories**

Hobart Brothers, Troy, Ohio  
 Lincoln Electric Co., Cleveland, Ohio

**Welding Electrodes and Holders**

Hobart Brothers, Troy, Ohio  
 Lincoln Electric Co., Cleveland, Ohio

**Welding Generators, Arc**

Hobart Brothers, Troy, Ohio  
 Lincoln Electric Co., Cleveland, Ohio

**Welding Machines, Electric Spot**

Armiglo Co., Milwaukee, Wis.  
 Eisler Engineering Co., Inc., Newark, N. J.  
 Interstate Machinery Co., Chicago, Ill.  
 Pier Equipment Mfg. Co., Benton Harbor, Mich.  
 Ward Machinery Co., 504 W. Washington, Chicago, Ill.

**Welding Machines and Equipment, E. I. Arc**

Hobart Brothers, Troy, Ohio  
 Lincoln Electric Co., Cleveland, Ohio  
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

**Welding Machines, Resistance**

Armiglo Co., Milwaukee, Wis.  
 Eisler Engineering Co., Inc., Newark, N. J.  
 Lincoln Electric Co., Cleveland, Ohio  
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

**Woodworking Machinery**

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Drill, 3 spindle Henry & Wright, m. d., like new	\$575
Drill, 4 spindle Allen b. b.	385
Drill, 4 spindle Leland-Gifford b. b.	395
Drill, radial, 3 <sup>1</sup> / <sub>2</sub> " single pulley drive Prentice	375
Engraving machine, Deckel-Gorton.	
Grinder, Pratt & Whitney 14" vertical.	475
Grinder, Abrasive No. 3, excellent	795
Grinder, Head No. 55, cylinder, complete	475
Grinder, universal Fraser No. 2, self-contained	625
Lathe, 26 <sup>1</sup> / <sub>2</sub> "x14" Putnam s. q. c. 3 step cone	595
Lathe, 26 <sup>1</sup> / <sub>2</sub> "x10" American 3 step cone No. 53395.	675
Lathe, turret, B. & O. 14" collet, complete	325
Lathe, turret, P. & W. No. 2 <sup>1</sup> / <sub>2</sub> " collet, complete	175
Miller, Whitney hand, vertical attachment, No. 6.	125
Miller, Van Norman No. 0.	425
Miller, B. & S. No. 0 like new	350
Miller, Becker No. 2, 2A vert. millers, rot. table.	
Miller, Cincinnati No. 2 vert., high power	895
Miller, Fox No. 38, complete, like new.	150
Nibbler, Gray No. 1, 3/16".	250
Presses, No. 15, No. 19, No. 20 Bliss power.	
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Punch, Cleveland BA, 1 <sup>1</sup> / <sub>2</sub> " thru 4 <sup>1</sup> / <sub>2</sub> ".	
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Hammers, 6-N Nazeil air, motor drive.	
Keyseater, No. 32 Baker, motor drive.	
Keyseater, No. 30 Catlin, motor drive.	
Lathe, 72"x10" Putnam, gear head, motor drive.	
Lathe, 64"x25" Gleason, motor drive.	
Lathe, 28"x17" Chard, motor drive.	
Multiple spindle drills, No. 14 Natco, motor, drive, 16x24" rectangular head.	
Multiple spindle drills, No. 30 Natco, m. d., 20" round hd.	
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Drill, Prat & Whitney No. 13 multiple spindle, 1/2" capacity	175
Drill, Henry & Wright single spindle, 1/2" capacity	175
Drill, radial, 4" gang, cone driven	225
Drill press, H. & W. 2 spindle, b. b., motor driven	225
Furnace, American No. 32 rotary	300
Furnace, American No. 71-A rotary	175
Gear cutter, Brown & Sharpe 3x36, arr. for m. d.	250
Grinder, disc, Gardner No. 4 ball bear. ring wheels	225
Lathe, Johnson geared face plate drive, 36x24" bed	375
Lathe, Greenlee flat turret, 34x10, 3-jaw chuck	175
Lathe, turret, Warner & Swasey No. 8, power feeds all directions, 3-jaw chuck	275
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Rebuilt and Guaranteed.

## FOR SALE BY

Miller, plain, No. 2 Cincinnati, tbl. 46"x10", b. d. Miller, plain, No. 28 LeBlond, tbl. 52"x11"-8", b. d. Miller, plain No. 28 Ohio, table 52"x11"-8", belt drive. Miller, plain No. 4 LeBlond, table 72"x16", belt drive. Miller, plain, No. 24 Brown & S. tbl. 80"x10" b. d. Miller, universal No. 2 Kempsmith tbl. 45"x10", b. d. Miller, universal No. 2B Hendey tbl. 45"x10", b. d. Miller, vertical, No. 3 Brown & S. table, 49"x164". Miller, vertical, No. 4B Becker tbl. 36"x10", m. d. Miller, vertical, model "B" Becker tbl. 57"x12", s.p.d. Pipe machines, Landis 2", 2" belt drive, (2). Pipe machine, J. Saunders, 4", 2" belt drive. Pipe machine, No. 204-B Oster, 1", 4", motor drive. Pipe machine, S. Williams, 24", 8" motor drive. Pipe machine, No. 114 Merrill, 24", 12" motor drive. Planers, 36"x16"x10" Cincinnati, 2 heads, belt drive. Presses, No. 5 Blissatiles type, bed 17"x20" st. 2", b. d. Press, trimming, No. 12 Erie, bed 26" str. 58", side sh. Press, wheel, 200-ton Hydraulic, 40"x10", m. d. Profilers, Nos. E3 and E4, Keller, motor drive. Punch & shear, "C" Cleveland 12/16", 4" belt drive. Rolls, angle, Kane & Roach 2"x12", motor drive. Saws, angle, 12" Racine, single pulley drive. Saw, hack, 12" x16" Peerless, motor drive. Shaper, 28" Queen City, back geared, belt drive. Shapers, 24" Gould & Eberhardt, V-ram, belt drive. Shaper, 24" Smith & Mills, back geared, belt drive. Shaper, 20" Cincinnati, back geared, belt drive. Shaper, 16" American, back geared, belt drive. Shear, alligator, No. 14 D. & K., 2", motor drive. Shear, square 24"x16" Niagara motor drive. Shear, square 10"x14" Niagara No. 2120, motor drive. Shear, square 156"x12" Hyde Park, 18" gr., motor drive. Straightener, No. 1 Kane & Roach cap. 12", m. d. Straightener, pipe, 8" Woodward, vertical, m. d. Straightener, 14"x8" F. B. Schuster, belt drive. Welders, arc, 300 ampere Lincoln, 220 volt, d. e.

## USED AND REBUILT MACHINERY

## FOR SALE BY

Service Co.,

3732 Cedar Ave., - Cleveland, Ohio

## WELDERS.

General Electric 200-amperes, A. C. (10).  
 Automatic 200 amperes with 6 cylinder engine (4).  
 Lincoln 300-amperes, gas engine drive (10).  
 Lincoln 400-amperes, gas engine drive (6).  
 Transforme type A. C. welders, 220-440 volt (20).  
 F. K. W. Lincoln 300 amperes a. c. drive (30).

We rebuild, buy, sell and rent welders.

## FOR SALE BY

M. A. Wertman Machinery Co.  
623 Penton Bldg. Cleveland, Ohio

Automatic, 14" Cleveland Model A & B.  
 Automatic, 48" Gridley single spindle. (2)  
 Automatic, 24" Gridley 4-spindle model F.  
 Grinder, No. 70 Heald, power feed, b. d.  
 Lathe, Reed 30"x18" l. c. g. low price.  
 Miller, No. 00 Brown & Sharpe hand.  
 Shaper, 17" Smith & Mills b. g., cone type.

## FOR SALE BY

West Penn Machinery Company

Air compressors, 30 to 2500 cubic feet.  
 Automatic National Acme "C" 9/16, motor drive.  
 Blower, No. 4 Roots, capacity 2110 c. f. m.  
 Bolt cutter, Acme 2", belt drive.  
 Boring mill, hor. 3" Giddings & Lewis s. p. d.  
 Boring mill, 42" King, belt drive.  
 Boring mill, 67" Betts, 2 heads, belt drive.  
 Boring mill, hor. 34" Rockford m. d.  
 Brake, 6"-gauge Ohl press type.  
 Brake, 7"x10 gauge Dreis & Krump motor drive.  
 Bulldozers, Nos. 2, 4, 6, 9, 28, & 30.  
 Crane, 5-ton Case, 65' span, 220-d.c.  
 Crane, 78-ton Morgan, 220-d.c. 65' span.  
 Crane, crawler, gas., No. 2 Northwest.  
 Drill, radial, 4" Prentice, taping attachment, b. d.  
 Drill, radial 5" Cincinnati-Bickford, motor drive.  
 Drill, radial 6" Prentice, single pulley drive.  
 Drill, multiple 24 spindle No. 30 Natco.  
 Drills, upright 10" to 36".  
 Drill press, 6 spindle Allen.  
 Engine, gas, 20 horse power Bessemer.  
 Flanger, McCabe, 4" capacity, dies.  
 Gear cutter, No. 8 Brown & Sharpe, 60x11 motor drive.  
 Gear cutter, 18" H. Gould & Eberhardt.  
 Gear cutters, 11", 18", & 24" Gleason.  
 Gear tester, bevel 18" Gleason.  
 Grinder, centerless, No. 2 Cincinnati m. d.  
 Grinder, roll Farrel 23"x64".  
 Grinder, double end 2 horse power 220/440/3/60.  
 Grinder, D.E., 3" 30" power 220/3/60.  
 Grinder, disc, No. 8-30" Besly, belt drive.  
 Grinder, disc, No. 4 Gardner, motor drive.  
 Grinder, Gisholt tool and cutter, motor drive.  
 Grinder, surface 8" Heald b. d.  
 Grinder, internal No. 60 Heald, belt drive.  
 Groover, No. 274-A Niagara, 4", 16 ga. motor drive.  
 Hammer, power, 50-lb. Blacker.  
 Hammer, power, 90-lb. upright, belt drive.  
 Hammer, power, 100 lb. Braddock cushion.  
 Hammer, Bradley 500 lb. upright.  
 Hammers, Nos. 2-B, 3-B, 4B, Nasel.  
 Hammers, steam, forging & drop.  
 Hoist, 1 ton Sheppard 220-V. direct current.  
 Keyseater, No. 2 Motts & Merrill, belt drive.  
 Ladles, 20 ton Whiting, top pour.  
 Lathe, 11"x5" Meyers, plain change gear, belt drive.  
 Lathe, 16"x6" Fendick, double back gear, q. c. g.  
 Lathe, 18"x8" Springfield, geared head.  
 Lathe, 20x10 geared head Schellenbach.  
 Lathe, 22"x12" R-L quick change gear, d. b. g.  
 Lathe, 24x10 Lodge & Shipley, q. c. g., d. b. g.  
 Lathe, 24"x13" Prentice, geared, head s. p. d.  
 Lathe, 42"x16" Schumacher Boye, q. c. g., belt drive.  
 Lathe, spinning 32" belt drive.  
 Lathes, turret, No. 4 Warner & Swasey, belt drive.  
 Lathes, turret, No. 6 Warner & Swasey, geared head.  
 Lathes, No. 2 Warner & Swasey, belt drive.  
 Lathes, turret, No. 2A Warner & Swasey, motor drive.  
 Lathe, turret, 17x8 LeBlond double back gear.  
 Miller, vert. No. 1 Brown & Sharpe, belt drive.

1210 House Building,

Pittsburg, Pa.

Miller, vertical No. 2 Knight.  
 Miller, vertical No. 6 Becker, motor drive.  
 Mixers, Sprout-Waldron, batch & liquid.  
 Pipe machine, 7" Landis, belt drive.  
 Pipe machine, 4" Oster 220-3-69 motor drive.  
 Pipe machine, 2", 6", 8", 12" Williams, motor drive.  
 Planer, 36x36x10" Cincinnati, 3 heads, belt drive.  
 Planer, 42x42x12" Cincinnati, 3 heads, belt drive.  
 Planer, 60x60x20" Pond motor drive.  
 Press, can, No. 69N Bliss, double action inclinable.  
 Press, hydraulic 100-ton Southward.  
 Press, hydraulic 200-ton Oilgear.  
 Press, horning 42-A Toledo belt drive.  
 Press, 18" Bliss open back inclinable 28" stroke.  
 Press, No. 4 Toledo o. b. i., 34" stroke.  
 Press, 78" Bliss, 12" stroke T. R.  
 Press, No. 58 Toledo, bed 20x19.  
 Press, No. 58 Toledo, 8" stroke.  
 Press, No. 72 Bliss, 8" stroke.  
 Press, double crank No. 8 Bliss, 2" stroke.  
 Press, gap, No. 74 Bliss consolidated 44" stroke.  
 Press, screw, No. 87 Niagara.  
 Press, 6 spindle, Waterbury-Farrell.  
 Punch, E.C. Cleveland, 36" throat, 14" thru 1".  
 Punch, No. 4-A Kent Owens universal combination.  
 Pumps, centrifugal 6", 4", 1", motor drive.  
 Riveters, air, hammer, spinning.  
 Rolls, angle, Niagara 11x11x1".  
 Rolling mill, cold 9"x18" motor drive.  
 Saws, friction, Nos. 2, 3 & 4 Ryerson motor drive.  
 Saw, cold, 48" Newton motor drive.  
 Saw, hack, Peerless, 6x220-3-50.  
 Saw, hack, Racine 6x6 motor drive.  
 Saw, hack, Peerless, 13" x16", motor drive.  
 Saw, shaping, Peerless 6x6. 220-3-50.  
 Scale, sheet bundling, 2500 lbs.  
 Shapers, 16", 20", 24" & 36" Gould & Eberhardt.  
 Shears, alligator, 14", 2", 2", 4", 6" Newton.  
 Shear, Angle 6x6x1" Long & Alstatter.  
 Shear, circle, Niagara, 4" cutters.  
 Shear, circle No. 3 Bliss, 49" x20 gauge.  
 Shear, bar 14", New Doty.  
 Shear, squaring No. 48 Excello 14ga. bls. 53".  
 Shear, plate, 80" x1" Pels.  
 Shear, 24x1" Bliss, belt drive.  
 Shear, rotary 24" throat capacity 1", motor drive.  
 Slitter, gang, 36" Yoder motor drive.  
 Slitter, gang, 36" Braddock, belt drive.  
 Shear, paper 45" x14" Kent, belt drive.  
 Slotters, 6" & 24" Newton.  
 Straightener, 8/16"x20" Shuster V belt.  
 Straightener, AS & TP 12"x21/8", belt drive.  
 Straightener, 42" Acta std. 17 roll 23".  
 Straightener, 48" Acta Standard, 17 roll 31".  
 Straightener, No. 5 K & R, 24" square belt drive.  
 Tumbling barrel, 34"x48", belt drive.  
 Thread roller, No. 201 V. & O., 4", belt drive.  
 Upsetters, 1" to 6".  
 Welder, 6k. w. split Thompson.  
 Welder, butt 18" Winfield.

## USED AND REBUILT MACHINERY

## FOR SALE BY

**The Nutmeg State Machinery Corp.**  
1041-1051 State St., New Haven, Conn.

Boring mill, Lucas No. 31—3" bar, power rapid traverse.  
Headers, Wat. Farrel, No. 6 D. S. S. D. (2), No. 1  
D. S. S. D. (1).  
Miller, Cincinnati No. 3 s.p.d. plain, slotted nose.  
Miller, Potter & Johnston No. 2M motor driven auto.

## FOR SALE BY

**Hazard Brownell**  
156 Pine Street, Providence, R. I.

Boring mill, 86" Betts vertical.  
Centering machine, No. 2 P. & W.  
Grinder, No. 12 B. & S. plain cylindrical.  
Grinder, Model D Walker S. S. surface, 12" magnetic  
chuck, m. d.  
Milling machine, No. 3 Rockford Rigidimill.  
Metal sawing machine, 6x6 Peerless.  
Turret lathe, No. 4-B Gisholt ram type univ. m. d.  
Turret lathe, No. 4 W&S belted motor dr. univ. m. d.  
Turret lathe No. 6 B&S GFH, automatic roller feed.  
Screw machine "GA" 4-spindle 12" Gridley.

## FOR SALE BY

**E. L. Klauber Machinery Co.**  
320-322 South Third St. St. Louis, Mo.

Filing machine, type 1A., La Porte.  
Grinding and polishing machine, continuous belt 14".  
Lathes, 14", 16" x 8" Monarch & Cincinnati.  
Miller, No. 8Y B. & S.  
Radial, 24" Carleton, sensitive, belt drive.  
Screw machine, No. 6 B. & S. wire fd.; 1" barfd. S. & K.

## FOR SALE BY

**D. H. Prutton Machinery Co.**  
5295 W. 130th Street Cleveland, Ohio

Automatic, Cleveland 8" model A and 8" M chuckers.  
Drill, No. 2—2 spindle Avematic.  
Drills, 1" cap. Demco 4 spindle, power feed, b. b. (3).  
Gear hobsers, No. 1 Schuchardt & Schutte.  
Grinder, disc, No. 50 Gardner motor drive.  
Tappers, (8) Webster & Perkins 5 spindle vertical.  
Press, 100—74—75—Bliss—55—65—Consolidated.  
Press, cam drawing, No. 1 Bliss & No. 87 Toledo grd.  
Presses, No. 4 & 5 Zeh & Hahnemann inclinable.  
Welder, spot, 15 KW Federal, automatic.

## FOR SALE BY

**Marr-Galbreath Machinery Company**

Air compressor, 8x6" Gardner-Rix, Duplex.  
Air compressor, 9x8" & 10x8" I.R., "ER" 1".  
Blowers, pressure, Am. 11-PB, 14,000 CFM.  
Boring mill, 6" bar, Niles-Bement-Pond, motor drive.  
Boring mill, 42" Bullard, 1 swivel and 1 turret head,  
motor drive, power rapid traverse.  
Boring mill, 30" Bullard or VTL, threading attach.  
Drill, 24" Aurora, tapping attachment.  
Drill, No. 11-B, Nacco, 16-spindle, motor drive.  
Drill, radial, 24" Canedy-Otto.  
Drill, radial, 24" Dresses, g. b., s. p. d.  
Exhausters, 1/20, 1/10 & 1/3 HP motors.  
Fan, ventilating, No. 4 American, 1/40/110.  
Forging machine, 14" Acme motor drive.  
Furnace, gas, Tate-Jones, 25" x 23" x 12".  
Grinder, No. 21a Head rotary surface.  
Grinder, 1/2 H.P. Mail, 90/110 flexible shaft.  
Grinder, No. 31 Landis 10"x30".  
Grinder, disc, No. 2 Gardner 20" wheels, m. d. 3/60/230.  
Hammer, power, 40 lb. Boss, belt drive.  
Hammer, power, 50 lb. Little Giant.  
Hammer, 200 lb. Beaudry, power.  
Hammer, 400 lb. Bliss board drop, belt drive.  
Hammer, 800 lb. Erie SF steam or air.  
Hammer, Syntron Electric, 1/40/110.  
Hoists, chain, g. i. 1, 2, 3 & 5 tons.  
Keyseaters, 3 M. & M., belt.  
Lathe, 8" Hjorth bench prec. thread, att., tur. m. d.  
Lathe, 16" x 10" G-K., gear head, tap, att. for motor drive.  
Lathe, 16" x 12" L. & S., quick change gear, tap, attach.  
Lathe, 18" x 8" Superior, quick change gear, d. b. g.  
Lathe, 20" x 10" Johnson quick change gear, tap, attach.  
Lathe, 22" x 12" Rahn-Larmon, quick change gear.  
Lathe, 25" x 14" Le Blond, geared head, motor drive.  
Lathe, 26" x 10" Wolcott, d. b. g., q. c. g.  
Lathe, Monitor turret, 18" x 6" Springfield.  
Miller, plain, No. 4 Ohio, 72" x 30" x 20".  
Nailing machine, No. 6 Morgan 8-track, m. d.  
Pipe machine, 2" Robbins, bench, motor 1/60.  
Polishing stand, 3 H. P., U. S. 2/60/230.  
Press, o. b. l., No. 4 Toledo, 3" stroke.  
Press, arbor 30 ton Lourie, hydraulic.  
Press, OBI No. 21 Bliss, 1" & 2" stroke (3).

57 Water St., Pittsburgh, Pa.

Press, 77½ Bliss, T. R., 10" stroke, double back gear.  
Press, D. C., No. 95-E Toledo, tie-rod; d. b. g., for m. d.  
Press, No. 57-S Toledo, d. b. g., friction clutch.  
Press, No. 594 Toledo tie-rod, d. b. g., friction clutch.  
Press, P-3 Ferracute motor drive.  
Press or shear, United 28" shaft, m. d.  
Pump, centrifugal 700 GPM, 4" disc.  
Punch & shear, hand, No. 5 Buffalo.  
Punch & shear, d. e. No. 46 Buffalo, 12" thts., 1-1/16" x 12"  
triple gag punch and notcher.  
Roll, bending, No. 10 K. & R., 3" x 8" cap., b. d.  
Punch and shear, No. 3 L. & A., 3" x 8", 14" throat.  
Punches, No. 6 Kidder.  
Riveter, No. 3A Grant, cap, 5/16", for motor drive.  
Riveter, Shuster, 3" & 3/16", belted.  
Riveter, No. 120 Grant, capacity, 3", motor drive.  
Saw, No. 10 Racine 9x9", belted.  
Saw, cold, No. 7 Esper-L., 15" belt.  
Saw, cold, No. 1 Newton, 4" belt.  
Saws, hack, 6x6" Peerless high speed, (2).  
Saws, universal shaping, 6x8", motor drive.  
Shaper, 21" Smith & Mills.  
Shear, 34" Barker back gear V-ram, belt drive.  
Shear, angle 8x8½" H. & J. motor drive.  
Shear, angle, 6x6½" Kling, motor drive.  
Shear, rotary 222 Bliss, 16 gauge.  
Shear, throatless 18-M Marshalltown, motor drive.  
Shear, squaring, 42" x 18 ga. Niagara, power.  
Shear, squaring, 48" x 14 gauge Excelsior, power.  
Shear, bar 24" United, 24" blade, motor drive.  
Slotted, 6" Newton, table 17".  
Straightener, Gag., capacity 8" pipe, m. d.  
Straightening mach., No. 2 Sutton, b. b., m. d.  
Steam turbines, 100 horsepower 900 reversible (3).  
Tiering machines 600 & 1000 lb. hand.  
Transmissions, Reeves, size 00-E, (2).  
Truck, Cowan Transveyor 500 lb.  
Tumbling barrel, tilting, 20x14", gear con. m. d.  
Valve refacer, Kwik-Way, cabinet base, motor drive.  
Welder, Arc 300 amp, 3/60/230.  
Wheel press, 150-ton Allen, 48" x 8".  
Wheel press, 80 ton 34" x 8" belt drive.  
Wheel press, 200 ton 93" x 14" motor drive.

## USED AND REBUILT MACHINERY

## FOR SALE BY

Russell Machine Co.

438 Oliver Bldg. Pittsburgh, Pa.

Boiler, water tube, 400 horsepower, new.  
 Boring mill, 84" Sellers vertical b. d.  
 Boring mill, 44" N-B-P hor. dbl. spindle m. d.  
 Crane, 10 ton hand power traveling, 46' 8" span.  
 Forging and upsetting machine, 24", 34", 4" and 5" Ajax iron bed.  
 Gear cutter, No. 3 Brown. & Sharpe Automatic.  
 Generating set, 400 KW A.C. steam.  
 Hammer, 1500 lb. Bliss board drop.  
 Hammer, 5000 lb. double frame NBP steam.  
 Lathe, 20x10" Hendey, double friction countershaft.  
 Lathe, 26" x11" Wickes heavy duty, double back gear.  
 Lathe, turret No. 2-A W. & S. ser. above 125,000.  
 Milling machine, plain, No. 3 Cincinnati.  
 Pipe cutting and threading machine 6" Merrill.  
 Press, 250 ton hydraulic, platen 50" x100".  
 Press, No. 20 Bliss OBI M. D. with motor.  
 Shaper, 24" Gould & Eberhardt.  
 Shear, Lennox rotary bevel, capacity 4".  
 Straightener, No. 1 Kane & Roach, cap. 1" rd. m. d.  
 Welder, arc, 300 amp. Lincoln portable DC.

## FOR SALE BY

Reliance Machinery Sales Company  
1405 Brighton Place, N.S. Pittsburgh, Pa.

Air compressor, 1190 cu. ft. Ingersoll-Rand.  
 Drill, 3 spindle Foote-Burt, adj. head, No. 5 MT.  
 Drill, 25" Prentiss, sliding head, tapping attachment.  
 Drills, radial, 3", 3½", 4" and 5", tapping attachment.  
 Grinder, No. 2 Greenfield universal tool and cutter.  
 Grinder, No. 2 Brown & Sharpe surface, motor drive.  
 Lathe, 48" x18" American, cone, triple geared, cheap.  
 Lathe, 38" x18" New Haven, cone head, cheap.  
 Miller, No. 5 B. & S., plain, table 16" x54", cone.  
 Planer, 36" x36" x12" Cincinnati, 2 heads.  
 Planer, 20" x20" x4" Pratt & Whitney, 1 head.  
 Press, No. 6 Toledo, o. b. i. 34" stroke.  
 Press, No. 58 Toledo geared, .7" shaft 8" stroke, high die space (25"); about 38,000 lbs.  
 Press, double, crank, Robinson, 80" wide, 4" shaft, 3" stroke, geared, 15,700 lbs.  
 Press, Waterbury, open back, geared, 3" shaft, 5" stroke.  
 weight about 4000 lbs.  
 Shapers, 16", 20" and 24", various makes.  
 Wire straightener & cut-off, 4" x5" Shuster.  
 Wire straightener & cut-off, 4" x12" Shuster.  
 What do you need? What have you for sale?

## FOR SALE BY

Scott-Bansbach Machinery Co.,

Automatic screw mch., cone, 1", 4 spdl., b. d....\$1000  
 Auto. screw mch., B. & S., Nos. 00, 0, 2.....\$500 to 1150  
 Automatic screw machine, Brown & S. No. 00G with slotter, No. 5931.....650  
 Automatic screw mch., Brown & Sharpe No. 2 Turret Former, cap. 1" x3" belt drive.....500  
 Automatic screw machine, Brown & S. No. 19 high speed, capacity 1" x12" belt drive.....400  
 Automatic screw machine, Brown & Sharpe, No. 19 high speed, with motor.....500  
 Automatic screw machine, Davenport, 1", 5 spdl., belt drive.....\$500 to 750  
 Auto. screw mch., Gridley 4 sp. Model G & F 12".....800  
 Automatic screw machine, Cleveland, Model A & B 1" to 34" belt drive.....\$250 to 400  
 Automatic screw mch., Cleveland 73" Model A belt drive, 13964.....2850  
 Miller, No. 0, Bristol, hand, 14" x12" x14".....315  
 Miller, No. 1A Milwaukee, g. h. cap. 22" x12" x19".....600  
 Miller, No. 18 Milwaukee, g. h. cap. 28" x10" x19".....800  
 Miller, No. 28 Ohio, plain, b. d., 28x10x13, vise.....600  
 Miller, No. 7 Univ., K. & T., c. h., 36" x8" x16".....750  
 Miller, No. 33 Kempsmith grd. head Production type, 38" x10" x11".....1000  
 Motor, 20 h. p. G. E., 220 volt, 60 cyl., 3 ph., 1145 r. p.m., complete.....200  
 Pipe machine, No. 308 Oster, 24" to 8", belt dr. ....500  
 Planer, 24x24x6 Ohio heavy duty, 1 head.....350  
 Planer, 72x72x12 Gray, 4 heads.....1,500  
 Press, Stecher screw for dies, 1700 pounds.....225  
 Press, No. 2 Walsh o. b. i. 12" stroke, 14 ton capacity, 1025 pounds, with safety.....175  
 Press, No. 3 Walsh o. b. i. 2" stroke, 22 ton capacity, 2100 pounds.....230  
 Press, No. 2 Robinson o. b. i. 2" stroke, 31 ton capacity, 2500 pounds.....275  
 Press, No. 15 Wold, O. B. I., 2" stroke, 26 ton capacity 2000 pounds.....225  
 Press, No. 15 Robinson, horn type with table and motor, A.C. 220 volt.....300  
 Press, No. 51, Bliss, Arch, 1" str., 25 ton, 1800 lbs. ....125  
 Press, No. 51 Toledo arch, 2" str., 54 t., 5200 lbs. ....350  
 Press, Waterbury Farrell, straight sided, geared, 8" stroke, 20 ton, 16" between.....300  
 Press, DG56, Ferrucate, tog., 5" & 10" str., 100 ton.....1000  
 Press, Hercules 15 ton, power forging or broaching, motor drive.....300  
 Punch, shear & bender, No. 23 Armstrong-Blum.....100

4607 West 20th St.,

Chicago, Ill.

Punch & shear, No. 52 Beloit comb. b.d., 1650 lbs. \$175  
 Punch, Kneeland, 10" throat, shears 5" x1" flats.....150  
 Riveter, No. 14 B, High Speed Hammer, capacity 1", motor shelf.....100  
 Riveter, No. 3A, High Speed Hammer, capacity 1", with 1/2 h. p. motor, 220-60-3.....200  
 Riveter, No. 4A, High Speed Hammer, 1" capacity, no countershaft.....200  
 Riveter, No. 5 A, High Speed Hammer, cap. 1", motor shelf.....275  
 Riveter, Grant No. 82, 101A, 80 and 120, capacity 1" to 1", belt drive.....50 to 125  
 Roll feed, double, 52" stock, 2" str., from No. 21.....21  
 Bliss press.....75  
 Saw, No. 2 Klem, band, for metal cutting, b. d.....200  
 Screw machine, Acme, plain head, 5" x4" b. d.....125  
 Screw machine, B. & S., No. 1 plain head, 5" x3", belt drive.....225  
 Screw machine, Foster, No. 5 geared hd., 14" x8", power feed, s.p.d.....500  
 Screw machine, S & K, No. 4, friction hd., 14" x8" belt drive.....250  
 Screw machine, Garvin, No. 3, friction head, 14" x7", belt drive.....150  
 Shear, 10" Dia. cir., No. 30 ga., cuts 58" dia. cir. ....45  
 Shear, Niagara, No. 65 circle, No. 18 gauge, cuts 48" circle.....75  
 Separator, McKinzie, for chips, blower type, belt or motor.....250  
 Separator, No. 1 American, cap. 1 bushel, b. d.....75  
 Separator, American, cap. 1 bushels, belt driven.....250  
 Shaper, 16" Steptoe, back geared, crank with vise and countershaft.....325  
 Shaper, 16" Cincinnati back geared crank, with vise and countershaft.....350  
 Shaper, 20" American, back geared, crank, vise and countershaft.....450  
 Shaper, 24" Queen City, back geared, single pulley drive or motor drive.....75  
 Tapper, R. & S., 1" cap., horizontal, on pedestal.....75  
 Tapper, Garvin, No. 2 automatic, capacity 1" and 1½" belt drive.....15  
 Turret lathe, 16" Cincinnati Acme, friction head, 2 jaw chuck, m. d. 1 h. p. 220-60-3.....30  
 Turret lathe, 24" x24", J & L, geared head, tools for bar work.....25  
 Turret lathe, 24" x26", J. & L, geared head, with chuck for chuck work.....35

## USED AND REBUILT MACHINERY

## FOR SALE BY

**United Machinery & Supply Co.**  
**1241 Walton Ave., - St. Louis, Mo.**

Baling press, for scrap, plunger type, b. d.  
 Brake, leaf, D & K 10'x16 ga. No. 304 a. c. m. d.  
 Drill, Harrington 6 spindle, 4" cap., b. d. 17" wide,  
 Hammer, 150 lb. air Nazel type, belt drive.  
 Hoist, drum hook type, 2 ton, air, 20' lift, Thor.  
 Miller, vertical all power feed, Becker, b. d.  
 Rolls, corrugating, Berthold 6' and 10' b. d. end.  
 Press, Streine double toggle, 12"x10 gauge, m. d.  
 Shear, circle & flanging, No. 200A Niagara, a. c., m. d.  
 Shear, 5"x16 ga. cap. Excelator, b. d., b. g., a. c., m. d.

## FOR SALE BY

**Standard Machinery Co.,**  
**347 Indiana Ave. Grand Rapids, Mich.**

Automatic, 14" Gridley, model F.  
 Boring mill, 12" Bullard vertical.  
 Boring mill, 24" Lucas horizontal.  
 Cold saw, 6" Higley.  
 Drill, Baker 3" heavy duty.  
 Drill grinder, Sellers 5" capacity.  
 Grinders, No. 40 Head Cylinder (2).  
 Grinders, No. 2 LaSalle (2).  
 Lathes, 9" Porter-Cable manufacturing (14).  
 Miller, model C-1 Becker heavy vertical.  
 Presses, Waterbury Farrel, s. t. shaft, 30" bet. upr.  
 Press, No. 6 Consolidated.  
 Shear, No. 1236 Libert Hi-Speed.

## FOR SALE BY

**Brown Machinery Company,**  
**2333 N. 9th St., - St. Louis, Mo.**

Compressor, Herron-Bury CCB 14"x9"x8"; 20 HP mtr.  
 Disc filer, Oliver S-1, motor drive, bench type.  
 Drills, 25" Amer., Bickford, G. E.; 36" Cincinnati.  
 Drill, radial, 3" Fosdick.  
 Drills, 4-spindle, Foote-Burt; 5-spindle Allen; Natco  
 type K 20-spindle.  
 Grinders, disc, No. 6-20 Besly double spindle; No. 220  
 Badger w/ 15" press.  
 Grinders, cylinder, Madison; No. 65 Head.  
 Grinder, universal, No. 2 Brown & Sharpe 12"x20".  
 Hammers, 50-lb. Little Giant; 120-lb. Kane & Roach.  
 Lathes, 20"x12" Putnam, taper att.; 18"x12" LeBlond;  
 18"x8" Lodge & Shipley; 18"x8" R & M; 17"x8"  
 Sidney.

Lathes, turret, 16", 21" and 24" Gisholt, chucks,  
 Millers, No. 1 B.R.K. & T.; No. 2 LeBlond; Nos. 2 and 3  
 Kempsmith; No. 3-B Owen with vertical attachment  
 and div. head; No. 38 Fox; No. 25 Becker-Brainard.  
 Pipe machine, No. 402 Oster 2" motor drive; No. 309A  
 Oster 2", motor drive.

Planers, 42"x12" Putnam, 3 heads.  
 Presses, o. b. 1, Nos. 1, 2, 3, Loibrough-Jordan.  
 Press, straight side, No. 7 Zeh & Hahnenmann.  
 Presses, vertical; 45-ton Elmes; 30-ton hydraulic.

Punches, single end, Cleveland "C" 26" throat 6" in 8";  
 Rock River style, L rapid action, 24" throat 6" in 8".  
 Punch & shears, dbl. end, No. L-10 Badger 16" throat,  
 6" in 8"; Queen City 8" in 8", motor drive,  
 Saw, cold, No. 14 Higley; 24" Knowlton.

Stereoscopy, Shore, Model C-2.  
 Screw machines, No. 3 J & L; No. 24 Pratt & W. hand.  
 Shapers, 20x6 Cincinnati, motor drive; 21" S. & M.  
 Shear, J. Lennox, rotary bevel.  
 Shear, GEM jig shear, 18" cap.; motor drive,  
 shear, square, 9 ft. Stark, 18 ga. capacity.  
 Welder, spot, Type 18 Toledo, capacity 20 ga.

Many other items—send us your inquiries.

## FOR SALE BY

**Industrial Machinery Company, Inc.**  
**2200-2300 Fletcher Av. Indianapolis, Ind.**

CINCINNATI PLANER 42" between housings, 36"  
 under the rail, table 8' between pockets; equipped  
 with two heads on the cross rail.

## FOR SALE BY

**J. L. Lucas & Son, Inc., Bridgeport, Conn.**  
 No. 6 American gas carburizing furnace.  
 No. 1D American gas carburizing furnace.  
 Both with nichrome retort.  
 F. O. B. cars, Ohio shipping point.

## FOR SALE BY

**Fuchs Machinery & Supply Company**  
**Omaha, \* \* \* Nebraska**

Boring bar, port, 6" and 10" star wheel.  
 Compressor, Union 2 stage, 150 cu. ft.  
 Drills, 1, 2, 3, 4, 5, 6, 8 spindle ball bear. Sipp, Henry &  
 Wright, Sigourney, Reed, etc.  
 Drill, 24" American sliding head.  
 Drill, 40" Barnes sliding head.  
 Grinder, 10"x20" Landis piston.  
 Grinder, 8"x32" Norton cylindrical.  
 Grinder, Norton universal, magnetic chuck.  
 Grinder, No. 10 Besley disc.  
 Hammer, 100 lb. Little Giant.  
 Hobber, No. 1 Adams Farwell.  
 Lathe, 16x8 Lodge & Shipley geared head taper att.  
 Lathe, 16"x8" Monarch quick change, new.  
 Lathe, 24" Bullard vertical, turret.  
 Lathe, 24"x10" American quick change.  
 Lathe, 25"x25" Blaisdell, loose change.  
 Lathe, 17" Woods turret, friction head.  
 Lathe, 14" Woods tilted turret friction hd. pwr. feed.  
 Miller, No. 4 Hendey plain s. p. d.  
 Miller, No. 2 Oesterlein, vertical attachment.  
 Planer, 36"x30"x12" Pond, side head.  
 Planer, 24"x24"x8" Sellers.  
 Shear, 16" 16 gauge Niagara power.  
 Shear and flanger, No. 208 Niagara.  
 Threaders, 302, 304, 306 Oster pipe.  
 Threader, 9/16 Geometric self opening head.  
 Welders, 150, 200, 300 ampere direct current arc.  
 Many other machines. Send for complete stock list.

## FOR SALE BY

**Segal Machinery Company**  
**117 S. Clinton St., - Chicago, Ill.**

Air compressor, 600 cu. ft. Inger-Rand Imp. type 10.  
 Bolt threader, Landis 1" capacity belt drive.  
 Grinders, 26" Badger disc b. 24" Gardner disc, b. b.;  
 No. 2 Wilmarth & Morman surface.  
 Hack saws, No. 1 Marvel; 6x6 and 9x9 Racine.  
 Lathes, 14x8 Hendey, q. c. g., taper and relieving  
 attach.; 14 and 18x8 Sebastian grd. head, q. c. g.;  
 24x12" Milwaukee, taper attachment.  
 Millers, No. 2 Kempsmith and No. 25 Ohio universal,  
 with dividing head, tailstock, spiral gears and vise.  
 Nibblers, No. 1 & No. 1B Campbell 24" throat.  
 Planer, 37"x32"x12" Gray 42"x42"x14" Hamilton 2 heads.  
 Radial drills, 3" Bickford; 5" Niles-B. Pond g. b. d.  
 Screw machines, No. 9 Brown & Sharpe automatic (2).  
 18" Acme universal, geared head, bar feed & equip't.  
 Shapers, 16, 20, 24" Kelly and Gould & Eberhardt.  
 Wire straightener and cutter, No. 6 Wells 8" capacity.

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## FOR SALE BY

Durham Mfg. Co.,

Muncie, Indiana

## CHROME PLATING PLANT.

Complete chrome plating plant now in operation. This plant purchased new 1935, cost \$10,000. Will sell cheap. Generating capacity 4000 amps.

## FOR SALE BY

J. Lee Hackett Company

5838 Commonwealth Ave., Detroit, Mich.

Shaper, Gould & Eberhardt 24", motor driven, universal table. Excellent condition.

## FOR SALE BY

Surplus Stock &amp; Machinery Co.,

620 W. Lake St.,

Chicago, Ill.

Boring presses, 1, 2, 2 & 4 spindle high speed ball bear., all makes, Nos. 1 & 2 Morse taper, hand or p.r.r. feed. Lathes, 16"x8" Headley taper attach., collets, late type. Lathe, 16"x10" Monarch geared head, motor in base. Mill, No. 2 Brown & Sharpe plain, tapered feed. Shaper, 20" Gould & Eberhardt, high duty, motor dr. Shaper, 24" Gould & Eberhardt, high duty, cone dr. Complete stock of metal working machinery.

Send us your inquiries.

**BORING MILLS, Heriz.**  
2½" bar, N.B.P. knee, a. c.,  
3½" G. & L. No. 32.  
4" bar, Gisholt, Knee M/D.  
5" bar, Niles Floor Type.  
6" bar, N.B.P. Floor Type.

**BORING MILLS, Vertical**  
42" N.B.P., m.d.

51" Bullard, Cone Drive.

60" Gisholt, P.R.T.

96" Niles P. R. T.

**DRILLS, Radial**

6", 7" Cinc-Bickford.

9" Reed-Prentice gear box m.d.

9" Mueller s.p.d., m.d.

4" & 5" Amer. Triple Purpose.

6" American, univ. & plain.

3" American, sens. tapping.

2, 4 & 6 Spindle Allens.

4 spindle Kokomo, 12%", over.

4 spindle No. 2B Edlund.

24" & 20" Barnes, Weigel.

32" Cinc. B. tapping, m.d.

**GRINDERS**

No. 2 Fraser Univer. 10"x30".

10"x36" Landis Plain (3).

12"x32" No. 2 Landis Univ.

12"x36" Landis Plain.

16"x50" Norton Self Cont.

26"x96" Landis Self Cont.

26"x120" Landis Self Cont.

48" Badger face, Hyd. Feed.

No. 16 Blanchard, 26" belt.

No. 11 Landis Tool & Cutter.

No. 55, 60 and 65 Heald Cyl.

## FOR SALE BY

Nelson Machinery Co., Green Bay, Wis.

Drill, rad., 4" Bickford No. 1, s.p.d., No. 5 Morse tap. Generators, 200 k. w. Westinghouse, 3-60-2300-514 Model, bare, (2).

Planer, 3x30x8" Gray, belt drive, single head.

Punch press, No. 45-N Bliss, 14" stroke, (2).

Punch and shear, Lambertville double end, both with 22" throat, will handle 14" plate.

## FOR SALE BY

Wisconsin Gear &amp; Engineering Co., Inc.

602 S. 2nd St., - - Milwaukee, Wis.

## GEAR GENERATORS.

Two gear generators, 6" Bilgram bevel—\$150. and \$250.

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Failor-Strafer Machinery Co.

136 Liberty St., - - New York, N. Y.

Bolt cutter, 2" Landis double head, motor drive.

Boring bar, 10"x30" Underwood portable.

Crane, 10 ton Niles, 37' span, a. c. motors.

Grinder, No. 16 Blanchard high power vert., sur., m. d.

Lathe, 26"x16" Bridgeford, geared head, m. d., taper.

Lathe, 48"x34" Bridgeford geared head, motor drive.

Miller, Becker, duplex Lincoln type.

Miller, Brown & Sharpe No. 24 plain.

Shear, squaring, 30" Bliss, capacity 5/16".

Nos. 3B & 2B Milwaukee, M.D.,

No. 2B Heavy B & S SPD.

No. 2 Rockford univ., cone.

**MILLERS, Vertical**

Model C8, Becker Continuous.

Model B Becker, feeds 36x14x

15, spd.

Model C Becker, s.p.d.

No. 5B Becker, Cone.

No. 2 Knight

**PLANERS**

84"x84"x18" N.B.P., M.D., 4 hds.

72"x12"x14" Betts 4 hds.

60"x60"x20" Pond, 4 heads.

48"x48"x10" Detrick & H.

open side.

42"x36"x12" & 24"x6" Cinci.

36"x36"x18" Sellers 4 heads.

36"x30"x8" D. & H. Openside.

30"x30"x10" D. & H. Openside.

30"x30"x8" Gray.

**TURRET LATHES**

1½" & 2" P. & W's. (2).

Nos. 3A & 2A W. & S. univ.

No. 4 W. & S. univ., grd. hd.

No. 4 W. & S. cone, screw.

3½"x36" & 24"x26" Acmes.

No. 5 Foster, 1-13/16" bar.

24" Gisholt, AC M/D, 6¾".

21" Gisholt, AC M/D, 3¾".

4L Gisholt—no cross slide carriage.

24" Gisholt Cone 5¼" H. S.

2½"x24" & 3"x36" J. & L.

**BENNETT-RAFKIN MACHINE TOOL CO., Inc.**  
Offices: 30 CHURCH ST., NEW YORK CITY

# EMCO REBUILT TOOLS

## PLANERS

- 144" x 76" x 48" Liberty Openside, m.d., brand new  
 60" x 60" x 30" Liberty Double Housing, m.d., brand new  
 48" x 48" x 15" Niles-Bement-Pond, reversing m.d., 4 heads  
 48" x 48" x 14" Niles-Bement-Pond, reversing m.d., 3 heads  
 36" widened to 60" x 36" x 12" G. A. Gray, belt, 2 heads  
 36" x 36" x 12" Niles, m.d., 4 heads  
 36" x 36" x 12" Fitchburg, m.d., 3 heads  
 30" x 30" x 12" Gray, m.d., 2 heads  
 30" x 30" x 10" American, belt, 1 head  
 30" x 30" x 8" Pond, belt, 1 head  
 28" x 28" x 10" Cincinnati, belt, 1 head  
 24" x 24" x 6" Ohio, belt, 1 head  
 24" x 24" x 6" Gray, belt, 1 head  
 24" Coulter Openside Crank, s.p.d., 1 head  
 24" Cincinnati Crank, m.d., 1 head  
 22" x 22" x 5" Pease, belt, 1 head

## MILLING MACHINES

- No. 4 Kempsmith Plain MaxiMill, m.d., in base ball bearings, National Standard Spindle, very late  
 No. 2, 3, 4 Cincinnati Plain, s.p.d., flanged spindle  
 No. 1 ½, 2, 3, 4, 5 Cincinnati Plain, cone  
 No. 1, 2 Cleveland Plain, s.p.d.  
 No. 3 Kempsmith Plain, cone  
 No. 13B Brown & Sharpe Plain, s.p.d., National Standard Spindle, like new  
 No. 2 Milwaukee Universal Double Overarm, s.p.d.  
 No. 2A Brown & Sharpe Universal, m.d., taper spindle  
 No. 2 Rockford Universal, s.p.d.  
 No. 2 Brown & Sharpe Universal, cone  
 No. 4B, 5, 6 Becker Vertical, cone  
 No. 4 Cincinnati Vertical, m.d., flanged spindle  
 C66A Newton 3 spindle Continuous, m.d., 48" dia. table  
 Becker Vertical Continuous, cone  
 6x80" Pratt & Whitney Thread, m.d.  
 24" Cincinnati Plain Automatic, m.d., National Standard Spindle  
 24" Cincinnati Duplex Automatic, m.d.  
 24" Cincinnati Duplex Automatic, belt  
 28" Cincinnati Semi-Automatic Duplex, belt  
 48" Cincinnati Worm Driven Plain Automatic, s.p.d.  
 48" Oesterlein Tilted Offset, m.d., National Standard Spindle, Timken Bearings, latest type  
 No. 33 Kempsmith Production, s.p.d.

## RADIAL DRILLS

- 2 ½" Fosdick, gear box  
 3" Carlton Sensitive, m.d.  
 3" Morris Plain, gear box  
 3" Mueller Plain, gear box  
 3 ½" American Triple Purpose, m.d. thru gear box  
 4" American Triple Purpose, m.d. thru gear box  
 4" American Triple Geared, gear box  
 4" Hammond Jack Knife  
 4" Morris Plain, gear box  
 5" American Triple Geared, d.c. drive  
 5" American Triple Purpose, gear box

- 5" Cincinnati Blackford Universal, m.d.  
 5" Dresses Plain, m.d. thru gear box, 15" column  
 7" Fosdick Plain, cone  
 6" Fosdick Economax, m.d. thru gear box on arm, 19" column, p.r.t., latest mechanical type  
 4" Cincinnati Blackford, gear box, semi-inclosed head

## BORING MILLS

73" Niles, m.d., p.r.t., 2 heads on rail, late type, like new

- 72" Niles, 2 heads, cone  
 60" Niles Heavy Pattern, m.d., p.r.t., 2 heads, brand new  
 60" Gisholt, m.d. thru gear box, p.r.t., 2 heads  
 60" Gisholt, variable speed m.d., p.r.t., 2 heads  
 48" Niles-Bement-Pond Car Wheel Borer, cone  
 42" King, m.d. thru gear box, p.r.t., 2 heads  
 40" King, m.d., 2 heads, p.r.t.  
 42" Bullard Rapid Production, belt  
 37" Niles, m.d. thru gear box, 2 heads  
 36" Bullard Rapid Production, s.p.d., side head  
 36" Colburn, gear box, 2 heads  
 39" Gisholt Vertical, cone  
 No. 1 Cleveland Horizontal, s.p.d. thru gear box  
 No. 2 Niles-Bement-Pond Horizontal, m.d., 3 ½" dia. spindle, brand new  
 No. 4 Niles-Bement-Pond Horizontal, m.d., 5 ½" dia. spindle

## ENGINE LATHES—GEARED HEAD

- 12"x6" Hendley, m.d., taper  
 14"x5" Hendley, s.p.d.  
 14"x6" Hendley, m.d., taper  
 16"x6" Hendley, m.d.  
 16"x8" Prentice, m.d.  
 16"x12" Prentice, s.p.d.  
 18"x8" Lodge & Shipley, s.p.d.  
 20"x6" Hendley, m.d.  
 20"x8" American, m.d., taper, 8 speeds  
 20"x8" American, m.d., taper, 12 speeds  
 20"x9" Lehmann, m.d., taper, 16 speeds  
 22"x12" Lehmann, m.d., taper, 16 speeds  
 22"x12" 10" Greave-Klusman, m.d., taper

24"x17" Boye & Ennes, BRAND NEW, m.d., 12 speed geared head, taper attachment, Timken Bearings throughout, motor driven oil pump. Latest type, shipped from factory May, 1937, never set up.

- 27"x12" Prentice, m.d., taper, 16 speeds  
 36"x12" Bridgeford, m.d., taper  
 36"x28" American, m.d., 16 speeds  
 36"x33" Niles, variable speed motor driven, with D.C. motor

*Many Additional Machines In Stock.  
 Let Us Know Your Needs.*

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 1000 Tennessee Avenue

Cincinnati, Ohio

# LIQUIDATING LARGE PRESSES

ALL MACHINES CAN BE INSPECTED UNDER POWER IN PRIVATE PLANT

**PRESSES**, straight side, tie-rod fr.  
No. 59 $\frac{1}{4}$  Toledo, m. d., air cushion.  
No. 59 $\frac{1}{4}$  Toledo, m. d., air cushion.  
No. 310 Bliss, m. d., air cushion.  
No. 58 Toledo  
No. 305 Bliss, 8" stroke

**PRESSES**, double crank  
No. 94 $\frac{1}{2}$ -E Toledo, m. d., air cushion.  
No. 95-E Toledo, air cushions, m.d.  
No. 8 Bliss, 120" bet. hsgs., air cushion.  
No. 104 Bliss, gap frame  
No. 24-E Bliss, gap frame  
No. 23-J Bliss, overh. gap fr., 6" str.  
No. 306 Ferracutte, 120" bet., 10" shft.  
No. 7-F Bliss, 96" between uprights  
Niagara No. 615, 62" between upr.  
No. 848 $\frac{1}{4}$  Hamilton, m. d., 84" bet.  
No. 92-B Toledo. 12" stroke  
Logeman hyd. scrap baler, complete, 32"x19"x72"

No. 96-G Toledo, 149" bet. uprights,  
24" str., tie-rod, wt. 162,000 lbs.  
Hyd. Watson S., 200 ton, 2-10" rams

**PRESSES**, toggle  
No. 408-B Bliss, 84" bet. upr.; 58x84  
bed, tie-rod  
No. 268 $\frac{1}{4}$ -C Toledo, 108" bet. upr.  
No. 796 $\frac{1}{2}$  Toledo, 108" bet. upr., m.d.  
No. 795 $\frac{1}{2}$ A Toledo, 72" bet. upr., m.d.  
No. 166 Toledo, No. 3 $\frac{1}{2}$ -B Bliss

**PRESSES**, OBI  
10-No. 6A Bliss, b. g., 6" str., m. d.

**PRESSES**, horn  
No. 26 Bliss  
No. 24 Bliss, swinging table

**PRESSES**, strip fd., No. 31-B McD.  
Roll feed, No. 6-A Bliss double

## OTHER DESIRABLE TOOLS

Angle Iron Shears, Coving., 6x4 $\frac{3}{8}$ ", dbl. end.  
Automatics, Brown & Sharpe, late serial  
No. 00G—serial No. 9900; No. 00—serial  
No. 9800; No. 00 over 6700; No. 2.  
Baling press, Galland & Henning, No. 10—  
M.C., with triplex pump, operating valve.  
Bending roll, 12",  $\frac{3}{8}$ " cap., drop end.  
Boring mills, 36" Bullard New Era, with side  
head, late serial numbers (2).  
Boring mill, hor. 4 $\frac{1}{2}$ " bar, m. d., rotary table.  
Brakes, box & pan, 5 & 6' Chicago Steel.  
Brakes, hand, 10' 14"—10' 18", 8" 16", 8" 12".  
Brakes, power, Chgo. Steel 10' 3 $\frac{1}{16}$ "; 10' 10"  
ga.; 8" 1 $\frac{1}{4}$ "; 6" 12 ga.  
Bulldozer, Rock River Crosshead 32x5 $\frac{1}{2}$ ".  
Drill, No. 242 Barnes Camel Back.  
Drill, 5' American triple purpose radial, m. d.  
Gang Slitter, 36" Yoder, m. d., levelling rolls.  
Grinder, No. 23 Heald Surf. 16" mag. chk.  
Grinder, Blanchard surf. 30" mag. chuck.  
Grinder, No. 2 B. & S.-univ. cyl. self-cont. m.d.  
Grinder, No. 2 B. & S. surf. m. d., mag. chk.  
Hammer, drop, 400 lb. Standard.  
Hammer, No. 2A, No. 5A Hi-Speed.  
Hand millers, No. 2 Kent Owens (4).  
Ironworker, Univ., Schatz, 6x6 ang., 3x3 Smith.  
Lathe, 16x6 $\frac{1}{2}$  Amer. grd. hd., motor-in-base.  
Lathes, 30"x16' L&S., t.a., 26" Bradford.  
Lathe, 36"x30' L & S., 24" centers, q.c.g.  
Lathe, 48"x18 Schumacher & Boye.  
Lathes, spin., Prybil 22", bb.; Tel. 30" bb.  
Lathes, Tool Room, 14x6 L & S.; 18x8 South  
Bend, m. d.; 22"x12' American.

Millers, Pl. & Vert., No. 3 Inger, 14x48 tbd.  
Millers, Plain, 3B and No. 1A Kearney & T.  
Millers, planer type, 36"x168" Ingersoll.  
Millers, Univ., No. 2 A. B. & S., div. hd., m. d.  
Miller, No. 3 Cinch-high pwr., vert. hd., div. hd  
Miller, No. 3 Cincinnati vert., m. d.  
Nibblers, Campbell No. 1 & 1B, m. d.; No. 2.  
Planer, 26"x8 Cleveland, openside.  
Planer, 60x60x18 N. B. P., 4 hds., m. d.  
Planer, 36"x12' Liberty, box table, m. d., 2 hds  
on rail, 1 side head.

Porcelain Vitreous Enameling Furnace.  
Press Brake, 10' 10 ga. OHL, excel. condition.  
Press, coining, 600 ton Waterbury-Farrel.  
Press, Hyd. Watson S., 200 ton, 2-10" rams.  
Saw, Friction, Nos. 1, 2, 3 Ryerson.  
Radial drill, 5' American, triple purpose.  
Radial Drill, 6' American, 5' Posdick.  
Roll, 10 $\frac{1}{2}$ " H. & J.  
Roller leveller, 60" wide x4 $\frac{1}{2}$ " dia. rolls, m. d.  
Roller leveller, 48", 17 rolls, motor drive.  
Roller leveller, Youngstown 60"x4 $\frac{1}{2}$ ", 17 rolls,  
m. d., like new.

Saws, hack, 6x6", 9x9" Peerless.  
Screw machine, model M, 4 sp., Cleveland.  
Screw Mch., auto., No. 306 New Brit. 6 sp.  
Shapers, 20" Queen City; 16" & 24" Milwaukee;  
16" & 24" Gould & Eberhardt.  
Shaper, 24" Ohio Dreadnaught, tilt top tbd.  
Shear, power, 10'  $\frac{3}{4}$ " United Eng.  
Shears, power, 13'  $\frac{3}{4}$ ", 5' 16" Bertsch, with hold-  
down, m. d.; 13'  $\frac{3}{4}$ " Woodard; 8'  $\frac{1}{4}$ "  
Bertsch; 6' 10 ga. Stoll, 24" gap. 10' 10 ga.  
Turret lathe, No. 4A W. & S.-univ.

**INTERSTATE**  
*Machinery Co., Inc.*



Office and Show Room, 109 S. Clinton St., Chicago, Illinois.

**VERTICAL BORING MILLS**

- 100" Niles-Bentley-Pond; 2 swivel heads; Power Rapid Traverse; Motor Drive.  
 60" Gibholz; 2 swivel heads; Power Rapid Traverse; Motor Drive.  
 60" Colburn; 2 swivel heads; Power Rapid Traverse; Motor Drive.  
 48" Colburn; 2 swivel heads, S. P. D.  
 42" Bullard; 2 swivel heads, S. P. D., P. R. T.  
 36" Bullard; 2 swivel heads, Belt Drive.

**HORIZONTAL BORING MILLS**

- No. 31 Lucas, 3" bar, S. P. D.  
 24" diameter bar Lucas, Single Pulley Drive.

**LATHES**

- 60"x22' Putnam, B. D.; with raising blocks to swing 80".  
 30"x17' Houston, Standard & Gamble, Belt Drive.  
 28"x20' Walcott, Belt Drive.  
 24"x19' American Gared Head, M. D.  
 12"x8' L. & S., Belt Drive, Taper Att., Collets.

**GRINDERS**

- No. 2 Cincinnati Centerless — Model H; Motor Drive.  
 No. 3-V Gallmeyer & Livingston Vertical Spindle Surface; Magnetic Chuck; Motor Drive.  
 No. 16 Blanchard Direct Motor Drive.  
 No. 3 Wilmart & Morman Surface.  
 No. 65 Head Internal.  
 No. 3 Bryant Internal.  
 No. 14 Gardner Disc, Ball-Bearing.  
 No. 1 Fraser Universal Tool and Cutter.

**AUTOMATIC SCREW MACHINES**

- 24" Gridley Model "G" 4-spindle.  
 14" Cone 4-spindle.  
 No. 2 Brown & Sharpe.

**VERTICAL TURRET LATHES**

- 24", 36", 42" Bullard New Era Type.  
**MILLING MACHINES**  
 No. 2 Cincinnati High Power Plain; Power Rapid Traverse; Motor Drive.  
 No. 2-B Brown & Sharpe Plain, Motor Drive.  
 No. 2VB Brown & Sharpe Plain, Motor-in-Base.  
 Nos. 3, 2 Cincinnati Plain; Cone Drive.  
 No. 15 Garvin Vertical.  
 No. 2 Kempsmith Universal, Belt Drive.  
 No. 1 Brown & Sharpe Plain, Belt Drive.  
 4" Pratt & Whitney Spindle.

**TURRET LATHES**

- No. 2A Warner & Swasey Hollow Hexagon Universal; Chucking equipment.  
 24" Libby, 7½" hollow spindle, Motor Drive.  
 24" Libby, 4½" hollow spindle, Motor Drive.  
 No. 5 Foster Geared Head, 2½" hollow spindle, S.P.D.  
 3"x36" J. L., with Bar & Chucking Equip., S.P.D.

**RADIAL DRILLS**

- 7' American Triple Purpose, M. D. thru gear box.  
 6' Cincinnati Bickford, Motor Drive.

**SHAPERS**

- 25" Smith & Mills, Motor Drive.  
 18" Gould & Eberhardt, Forced Fd. Lubrication, M. D.  
 16" Pratt & Whitney Vertical, Belt Drive.  
 6" Pratt & Whitney Vertical, Motor Drive.

**MISCELLANEOUS**

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**SCREW MACHINES:** W & S No. 6 Hand; Nat. Acme. Nos. 515, 52, 55, & 56 4-sp.; Gridley 4-sp. 7/8" & 4-sp. 1 1/4" cap.; Automatic, B & S No. 00 auto.  
**TAPPING MACHINES:** (2) Garvin No. 2 Vertical Automatic & Garvin No. 1.  
**THREAD MILLER:** Moline No. 10; Lees-Bradner No. 4 & No. 3. (2).  
**TURRET LATHE:** Bullard 36" vertical, rapid production.

Above is only small part of our large stock on hand.

## McDONALD MACHINERY CO.

1531-35 No. Broadway

ST. LOUIS, MO.

No. 4B KEARNEY & TRECKER PLAIN MILLING MACHINE, double over-arm, motor-in-base, with power feed rotary table, 99% new.  
**Automatics**, Nos. 0, 00G B. & S.  
 $\frac{3}{8}$ " Cleveland 4 spindle Model M.  
**Bolt Threader**,  $1\frac{1}{2}$ " Landis, M. D. with lead screw.  
**Brosch**, No. 3X-A Oiler, hyd., M. D.  
**Die Filters**, No. 5 Thiel, M. D. sawing attachment.  
**Drill Presses**, Single Spdl. 20" to 28"; 2 spdl. Allen; 3 spdl. Leland-Gifford B. B. M. D. power feed on each spindle 12" overhang No. 4 taper;

4 sp. Aveyomatics; Leland-Gifford Grinders, Disc: Nos. 4 and 6 Gardner; 26" Badger, B. B. Surface; No. 2 Reid; No. 3 Abrasive. Tool & Cutter: No. 1 LeBlond. Hack Saws, 6"x6" Peerless; 6"x6" & 9"x9" Racine. Ironworker, No. 7 Ryerson, M. D. Lathes, 12", 14", 16", 18" Hender, grd. hd., Motor Drive. All makes & sizes to 44"x16". Milling Mch., 5" P. & W. Automatic; No. 20, Van Norman Duplex; Pl. and Universal No. 1 to 3. No. 4 Cincinnati Vertical, S. P. D.

**Nibbler**, Nos. 1 and 1B Campbell. **Planers**, 42"x42"x14' Hamilton. **Presses**, 3G Bliss Tie Rod, 36"x72" bed, 6" str., dble. crank; No. 1 Bliss cam drawing; No. 74½ Bliss S. S. All sizes inclinable and horn presses. **Radial Drill**, 3' Bickford Motor Drive. **Screw Machines**, No. 4 Warner & S. Universal.  
 Nos. 1, 5, Foster and Warner & S. **Shapers**, 16"-28" G. & E., Milwaukee, etc. **Shears**, 3' Niagara 10 gauge. **Welders**, 200 Amp. USL arc; 5-25 K. W. Spot; 15 K. V. A. Butt.

## VICTOR MACHINERY COMPANY, 130-132 S. CLINTON ST., CHICAGO, ILLINOIS

## HIGH GRADE MACHINE TOOLS

No. 32 GIDDINGS & LEWIS HOR. BOR. MILL. 6' AMERICAN TRIPLE PURPOSE RADIAL DRILL, ARR. FOR MOTOR DR. ON ARM. No. 55 TOLEDO PRESS—TIE ROD CONSTR. NO. 4 BROWN & SHARPE UNIV. GRINDER. NO. 2 DIAMOND SURFACE GRINDER. NO. 70 HEALD INTERNAL GRINDER. 36" DIAMOND FACE GRINDER.

No. 24-53" GARDNER HORIZ. DISC GRINDER. 18" CINCINNATI AUTO. MILLING MACHINE. No. 3 KEMPSMITH UNIVERSAL MILLER. No. 13-B BROWN & SHARPE MILLER. No. 2-4-6 WARNER & S. TURRET LATHES. No. 3 THIEL DIE FILING MACHINE. No. 1 PRATT & W. GUN BARREL DRILL. No. 3-12 BARBER COLMAN GEAR HOBBERS.

## Indianapolis Machinery & Supply Co., Inc.

1939-69 SOUTH MERIDIAN STREET INDIANAPOLIS, INDIANA

## What do YOU need?... Get in Touch with MOREY

**BORING MILLS** — Horizontal and Vertical  
 LAMBERT 3" bar Horizontal.  
 CLEVELAND No. 1 Horizontal 2½" bar.  
 BULLARD 24", 42" New Era Type Vertical.  
 ROGERS 60" Vertical; 2 heads.  
 POND 90" 2 heads vertical.

**LATHES**  
 NILES BEMENT POND 46"x16", Q. C. G.  
 PITTSBURGH 36"x28", geared head.  
 PUTNAM 36"x28", geared head—Nearly New.  
 BRIDGEFORD 36"x60" comb. boring and turning.  
 BRIDGEFORD 36"x60" boring.  
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 BROWN & SHARPE No. 3 Vertical.  
 CINCINNATI 24", 48" Automatic.  
 INGERSOLL No. 3 Combined heavy duty vertical.  
 INGERSOLL 24"x24"x12" planer and slab types.  
 NEWTON No. 2 Vertical spindle keyset.  
 P. & W. 4½x12, 6x14", 6x48", 6x80" thread.  
 BECKER C-1 and C Vertical.  
 BROWN & SHARPE No. 13B Plain.  
 CINCINNATI No. 2, 3, 4 Plain; S. P. D.

**PLANERS**  
 CLEVELAND 48"x48"x15"; 4 heads openside.  
 AMERICAN 36"x36"x20"; 3 heads.  
 BETTS 42"x42"x12"; 4 heads.  
 N. B. P. 48"x48"x16"; 4 heads.

ASK FOR DETAILS—1000 OTHER MACHINES IN STOCK.

**MOREY MACHINERY CO., Inc.**

### DRILLS—RADIAL

AMERICAN 3", 5" triple purpose.  
 CINCINNATI BICKFORD 5" full universal.  
 DRESES 3" and 5" Plain, S. P. D.

### DRILL PRESSES

NATCO Nos. 12, 13 and 22 Multiple spindle.  
 NATCO C11 Drill—mechanical feeds.  
 NATCO C13H Drill—hydraulic feeds.  
 PRATT & WHITNEY No. 12 rectangular head.

### GEAR CUTTING EQUIPMENT

BARBER COLMAN Nos. 3 and 12 Gear Hobbers.  
 BROWN & SHARPE No. 13 Gear Cutter.  
 GOULD & EBERHARDT 36H, 18H, 12H gr. hob.  
 CLEVELAND 6 spindle Spline Hobber.  
 GLEASON 10", 15" Spiral Bevel Gear Finisher.  
 GLEASON 24" bevel gear planer.  
 FELLOWS No. 6, 61, 615; FELLOWS Nos. 7, 71.  
 LEES BRADNER Lapper, cap. 1¼"x8".  
 WHITON No. 14 Spur and Bevel.

### GRINDERS

PRATT & WHITNEY No. 14 surface.  
 LANDIS 10x24, 10x36, 10x72, 12x72 cyl.  
 BRYANT No. 3 Internal.  
 HEALD No. 70, 70-A, 72, 72-A-3 Sizematic.  
 NORTON Type L 12x36 Universal; Motor Drive.

410 Broome Street  
 NEW YORK, N. Y.

# MILES' QUALITY TOOLS

**AUTOMATICS**

8" & 12" Bullard Multiaumatic.  
10" Bullard Continumatic.  
18" Gisholt Simplimatic.  
14" Fay.  
Nos. 454 & 654 New Britain.  
Nos. 24 & 33 New Britain.  
Nos. 5A & 6A Potter & Johnston.  
41 bar machines from  $\frac{3}{8}$ " to  
 $\frac{3}{4}$ ", B & S, Cone, Gridley,  
National Acme, etc.

**BROACHES**

10 ton Metalwood hydraulic.  
15 ton Oilgear hydraulic.  
No. 3 Oilgear hydraulic.  
No. 3 American rack.  
No. 3 J. N. Lapointe double.  
Nos. 0, 3, 4 Lapointe.  
2 ton American vertical.

**COMPRESSORS**

Several from 25' to 92'.  
106",  $1\frac{1}{2}$ "x6" Chicago, NSB.  
120", 8"x6" Inger. Rand, ERI.  
136", 8"x8" Ing. Rand, ERI.  
173", 9"x8" Ing. Rand, ERI.  
184", 9"x10" Gardner Rix.  
245", 10"x10" Inger. Rand,  
ERI.

265", 9 $\frac{1}{2}$ "x12" Worthington.  
355", 12"x10" Ing. Rand, ERI.  
360", 12"x10" Chicago, NSB.  
446", 14"x10"x10" Bury, 2-stg.  
550", National type 3VD.  
700", 17"x9 $\frac{1}{2}$ "x12" Sullivan

**WJ3, angle compound.****DIAMOND BORERS**

Coutier 1 & 2 spindle vertical,  
motor in base.

**DRILLS**

21", 24" & 28" Cincinnati.  
20", 23", 24" Barnes all geared.  
24" Barnes 4 spdl. all grd.  
30" Snyder.  
Nos. 216, 217, 315, 321 Baker.  
No. 2 Mfg. Colburn 1, 2, 3, 4  
spdl.  
Nato multiple, Nos. 11, 12,  
C12, 13, C13, 14, B14 & 30.  
No. 1 Pratt & Whitney gun.  
6 spdl. Pratt & Whitney deep  
hole.  
Nos. 6D, 11D & 16D Moline.  
No. 10D Moline cylinder borer.  
5 spdl. Detroit automatic.  
Nos. 15 $\frac{1}{2}$  & 17 Foote Burt.  
2 $\frac{1}{2}$  Morris radial.  
3 American sensitive radial.  
3 Dreses radial.  
3 Clint Bick radial.  
3 $\frac{1}{2}$ , 4, 5" and 6" Western  
radial.  
4 Mueller radial.  
4 Hammond radial.  
6 N.B.P. univ. radial.  
Sensitive:—Avey, Leland Gif-  
ford, Allen, L. G., H. & W.,  
etc., 1 to 6 spindles, sizes  
No. 1 to No. 3.

**FORGING TOOLS**

No. 25 W. & W. bulldozer.  
No. 5 I Nazel hammer.  
No. 1 Ajax forge rolls.  
1", 1 $\frac{1}{2}$ " & 4" Ajax upsetters.  
1 $\frac{1}{2}$ " Acme upsetter.  
1 $\frac{1}{2}$ " No. 3 W. F. cold header.

**GEAR CUTTERS**

Nos. 6 & 715 Fellows.  
No. 12 Barber Colman.  
Nos. 18H & 24H, G. & E.  
Nos. 1 & 5A Leeb Bradner.  
28" & E. spur & bevel.  
36"x10" Newark automatic.  
Nos. 3 & 4 B. & S. auto.  
6" & 11" Gleason bevel.  
Lipe 2-spdl. chamferer.  
Gleason quenching press.  
No. 2 Bilton gear miller.

**GRINDERS**

No. 2 Cincinnati centerless.  
No. 2 Heim centerless.  
No. 72A3 Heald Sizematic.  
Nos. 70 & 72 Heald internal.  
No. 12 Bryant internal.  
No. 3 Barber Colman hob.  
16"x32" Norton crank.  
16"x48" Landis crank.  
No. 4 Brown & Sharpe univ.  
No. 1 Bath universal.  
No. 16 Blanchard surface.  
6"x36" Norton surface.  
8"x20" Wil. & Mor. surface.  
12"x48" Springfield surface.  
20"x50" Safety Emery surf.  
30"x72" Springfield surface.  
30"x84" Diamond face.  
18", 24" & 30" Gardner disc.  
No. 8, 220 & 221 Badger disc.  
8" Arter auto. piston ring.  
12" Arbor rotary surface.  
Landis:—6"x18" to 16"x53".  
Norton:—6"x32" to 14"x72".

**ENGINE LATHES**

14"x16" & 16"x6" Monarch.  
14"x6" American grd. hd., T. A.  
16"x8" & 16"x10" Lodge &  
Shipley geared head.  
18"x6" & 20"x8" Hendey, taper  
& relieving att'mt.  
21"x18" Leblond heavy duty.  
22"x10" Davis.  
20"x12" Wickes.

**LATHES, TURRET**

Nos. 2, 2A, 3A, 4 & 6 W. & S.  
Nos. 1B, 3 & 4 Foster.

**18" Libby.**

21" & 24" Gisholt.  
24" & 42" Bullard vertical.

**LATHES, MFG.**

8" Sundstrand stub.  
11"x4", 11"x6", 17"x6" Le-  
blond.  
17"x8", 20"x8" Wickes.  
13"x6", Automatic threading.  
26"x10" Leblond crankshaft.  
Nos. 9 & 12 Leblond Multicut.

**MILLERS**

Nos. 2, 3, 4 Cincinnati.  
Nos. 1 $\frac{1}{2}$ , 2 hy., 3B & 4B B&S.  
No. 1 $\frac{1}{2}$  Rockford univ.  
No. 2 Cincinnati univ.  
No. 2 Brown & Sharpe vert.  
No. 6 Becker vertical.  
24" Cincinnati duplex.  
24" & 48" Cincinnati automatic.  
24" & 48" Newton rotary.  
48" Ohio tilted offset.  
Nos. 13B & 33 B. & S. Mfg.  
No. 3 Sundstrand Rigidmill.  
No. 4—36 Cincinnati Hydromatic.

**BORING MILLS**

24" Bullard, side head.  
30" Bullard, single turret.  
34" Colburn single turret.  
36" Niles car wheel.  
42" Bullard with side head.  
42" King, 1 pl. & 1 turret hd.  
42" Detrich & Harvey.  
60" Gisholt.  
3" Binsee horizontal.

**PLANERS**

24" Cincinnati crank.  
30"x30"x12" Cleveland openside.  
32"x32"x12" Niles.  
36"x36"x16" Cleveland openside.  
48"x36"x10" Liberty openside.

**PRESSES**

No. 5 grd. Toledo OBI.  
No. 4 Rockford OBI.  
No. 75 grd. Toledo openback.  
Nos. 1 $\frac{1}{2}$  B & 5A Bliss toggle.  
No. 200 Consol. cam draw.  
No. DDG 54 Ferracate cam.  
600 ton Cleveland coining.  
250 ton Ferracate coining.  
Nos. 55 $\frac{1}{2}$ , 56, 56 $\frac{1}{2}$ , 58 Toledo.  
Nos. 64, 65, 66 Consolidated.  
No. PG 4 Ferracate.  
No. 41 & 41A Toledo horn.  
72" No. 3G Bliss dbl. cr.  
No. 30 $\frac{1}{2}$  Bliss arch frame.  
No. 7 Z. & H. percussion.  
Nos. 23 & 25 $\frac{1}{2}$  Consol. horn.  
No. 176 Consol. gap dbl. cr.

**RIVETERS**

High Speed:—Nos. 1 $\frac{1}{2}$ B, 2A,  
3A, 4A, 5A, 6B & 7B.  
20 & 50 ton Allen air.  
SAWS

6"x6", 8"x8" & 12"x13" Racine.

6"x6" Peerless shaping.

23" Newton cold saw.

**SHEET METAL TOOLS**

4"x1" Niagara shear.  
10"x16" Bertsch shear.  
No. 1 Gray metal cutter.  
Nos. 1 & 2 Campbell nibblers.  
48" McKay roller leveler.  
2 $\frac{1}{2}$ " &  $\frac{1}{2}$ " Shuster straighteners.  
Nos. 1 & 2 Pettingell hammers.  
1 $\frac{1}{4}$ "x1 $\frac{1}{2}$ " Bertsch angle roll.  
Spot welders, 7 to 100 k.v.a.

**2000 Tools in Stock. Send for List.**

# MILES MACHINERY CO.

SAGINAW, MICHIGAN

## OTT MACHINERY SPECIALS

**AUTOMATICS.** Cleveland Model A,  $\frac{1}{2}$  to  $\frac{1}{4}$ ".

Gridley 4 spindle Model F,  $1\frac{1}{2}$ " and  $2\frac{1}{2}$ ".

Threading Lathe, Coulter  $13\frac{1}{2}$ " x 6".

**BORING MILLS.** Landis 3" Bar,  $24\frac{1}{2}$ " x 50" Table.

Landis 10" Bar, Floor Type, Motor Drive.

Bullard 24" Rapid Production.

**DRILLS.** Mueller Plain Radial, 4", Motor Drive.

Western Plain Radial, 3" & 5" Motor Drive.

**GEAR HOBBERS.** Barber-Colman Nos. 3 and 12.

Less-Bradner Nos. 1 and 8A.

**GEAR SHAPERS.** Fellows Nos. 6, 61 and 7.

**GRINDERS.** Heald Nos. 55, 65, 70, and 75.

Norton Plain, 6" x 32", 10" x 36", 14" x 50".

Landis 10" x 52" Plain, S. C.

**LATHES.** American 16" x 18", GH, QC, TA, MD.

Springfield Ideal 18" x 24" T. A., M. D.

Niles, B. & P., 26" x 10", Triple Geared, MD.

Warner & Swasey No. 2-A Unit, Geared Head.

**MILLING MACHINES.** B. & S. No. 2B Hwy. Pl. SPD Cinti. 48" Duplex; Rockford No. 3 & 20 Rigid.

**PRESSES.** Toledo No. 36P solid back.

Toledo No. 56 & 57 S.S.S.F. Geared, Side Shear.

AND MANY MORE GOOD TOOLS

**OTT MACHINERY SALES, Inc., 548 Second Ave., DETROIT, MICHIGAN**

## PHILADELPHIA'S LARGEST DEALERS IN MACHINERY & EQUIPMENT

Angle shrt., 6" x 6" x 1" L. & A., m.d.

Bolt cutter, 2" Landis belt drive.

Boring mill, 24" Bullard, rap. prod.

threading attachment.

Drill, D2 Colburn, 3" cap.

Gear cutter, No. 14 Whitton auto.,

spur and bevel, 34" max.

Gear hobbers, 18" & 24" Gould & E.

Grinders, No. 3 Diamond, surface,

cap. 12" x 48", motor drive.

Lathes, 14" x 5" L. & S. g. h. t. a.

Lathe, 16" x 16" South Bend, mtr. dr.

Lathes, 18" x 10" L. & S. g. h. t. a.

Lathe, 30x24 New Haven, belt.

Lathe, 36" x 16" Putnam, triple geared

quick change.

Lathe, 36" x 26" Johnson, belt drive.

Lathe, turret, No. 1 B&H standard screw

machine, belt drive, lot of equip.

Lathe, turret, 3A Warner & Swasey

S. P. drive, cap. 38".

Miller, "D" Becker vertical, m. d.

throat 29", table 20" x 90".

Miller, No. 2 Kempsmith, plain,

table 10" x 48", belt drive.

Miller, No. 5 Cincinnati plain, table

76" x 19", s. p. drive.

Pipe machines, 2, 4, 6, 8 and 12"

belt and motor drive.

Planer, 48" x 48" x 16" Pond, 4 heads,

belted motor.

Press, No. 41 Robinson, 36" up. b.

geared stroke 2", weight 11,000 lbs.

Punch, 24" Rock River, motor dr.

4" x 1"

Punch, No. 2 H. & J. horis. cap.

1" x 1"

Saw, 10" x 10" Napier, metal band.

Shapers, 14, 16, 20 & 24" various makes

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## CHICAGO'S LARGEST STOCK OF ELECTRIC POWER EQUIPMENT

### AIR COMPRESSORS

C.P.M.	Make	Lbs. Pressure	Type
2 2714	Ingersoll Rand	40	Belt driven
1 1220	Bury	30	Belt driven
1 1100	Bury	100	Belt driven
1 1004	Ingersoll Rand	35	Steam driven
1 840	Gardner Denver	125	Synchronous
3 872	Gardner Denver	55	Belt driven
1 571	Gardner Denver	100	Belt driven
3 368	Ingersoll Rand	100	Belt driven
3 340	Sullivan	100	Belt driven
1 317	Union	100	Steam driven

1 17 KW Acme 18" throat spot welder.

1 50 HP Howell 1725 RPM high slip motor.

1 50 HP G. E. 600 RPM new vertical gearmotor.

1 40 H.P. G. E. 600 RPM new gearmotor.

1 1800 HP Faik 500/450 to 190/145 RPM reducer.

2 80 HP James 300:48 RPM speed reducers.

600, 200, 150, 100 KW synchronous M. G. sets

75, 200, 300, 500 Ampere arc welders.

2000 CFM and 4500 CFM G. E. 15 lbs. pressure

turbine driven centrifugal air compressors.

2700, 3300, 3800 and 4500 CFM centrifugal air

compressors, motor driven.

**Chicago Electric Company,**

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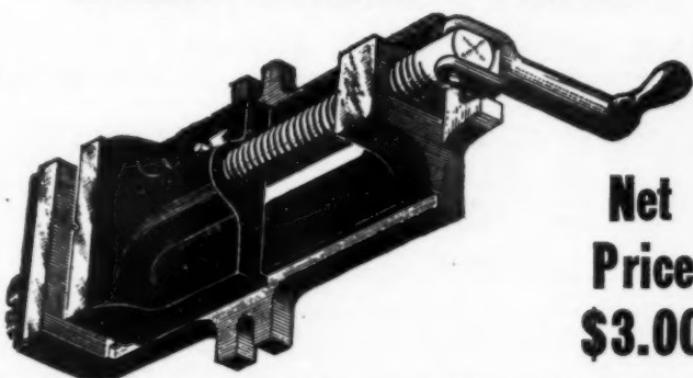
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FOR ALL TYPES OF USED  
METAL WORKING MACHINERY  
STAMPING PRESSES - STRUCTURAL TOOLS

LOUIS E. EMERMAN AND COMPANY

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— ALSO FORGING EQUIPMENT — HYDRAULIC EQUIPMENT  
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— OUR PRICES REPRESENT REAL VALUES  
SEND US YOUR INQUIRIES

# VICTOR'S BARGAINS IN NEW DRILL PRESS VISSES



**Net  
Price  
\$3.00**

Vise is made of best cast iron. Base is ground parallel to jaws. Sliding surfaces accurately planed and fitted.

Vise opens  $3\frac{3}{4}$ ".

Jaws  $3\frac{1}{2}$ " wide and  $1\frac{1}{2}$ " deep.

Vise screw,  $\frac{3}{4}$ " diameter, V cut thread.

Three flanges for clamping vise in convenient position.

Handle swivels so that it can be operated in cramped position.

V-slot is milled in sliding jaw for holding work vertically.

**SEND FOR OUR GENERAL CATALOGUE**

**VICTOR MACHINERY EXCHANGE, INC.**  
**251 CENTRE STREET,** NEW YORK, N. Y.

14"x6' Champion Lathe, LCG acr. cutting, compl.	\$ 85	Bilton No. 25 Plain Mill, Power Feed, Range	225
14" Francis Reed Drill Press, No. 2 M. T.	25	22"x7"x16", like new.....	
36" Fellows Gear Shaper, No. 6 compl.	150	20" Smith & Mills B. G. Crank Shaper, 4 Step	210
No. 5 Niagara Power Press, 2" str., welded frame, good condition.	225	Cone Dr. complete.....	70
4 1/2" x 4 1/2" Racine H. S. Hack Saw, M. D., A. C.	60	36" American Band Saw, Belt Drive	145
No. 2 W. & S. HandScrew Machine, 1" cap.	125	60" Chicago Box & Pan Brake, 14 ga.	100
36" Corrugating Rolls—Standard.	70	36" Badger Bending Rolls, 3" Rolls, all geared; hand or power.....	

*Most of these items are still under power and are priced low to avoid rehandling.  
Every item sold on money back basis if not satisfactory. We carry more than  
1500 Machines in stock. Please send us your inquiries.*

## FALK MILL SUPPLY COMPANY, INC.

18 WARD STREET ROCHESTER, N. Y.

## REBUILT - IMMEDIATE DELIVERY

No. 4-G LeBlond Plain Miller, S. P. D.	24"x10" swings 27 1/2" Greaves-Klusman heavy duty
No. 3-B Milwaukee Universal Miller full equipment and vertical attachment, S. P. D.	Lathe, 20" 4 Jaw chuck cone.
No. 3 Le Blond plain miller, cone.	21"x12" Le Blond Lathe, cone.
No. 2-A Garvin universal miller, cone.	14"x6" Hendey Lathe, cone.
24" Gould & Eberhardt Shaper, cone.	12"x7" Landis Plain Grinder.
16" American shaper, cone.	No. 11 B. & S. plain grinder.
4 1/2" Morris Radial, gear box.	14" Pratt & Whitney surface grinder.
3 1/2" American radial, gear box.	3-Spindle Leland-Gifford Drill, with tapping heads, pump and piping, No. 2 M. T.
No. 1 Hoosier Heavy Duty Drill, M. D.	No. 1-B and No. 2-B Edlund 2 spindle Drills.

## IROQUOIS MACHINERY CO., 660 Ohio St., Buffalo, N. Y.

## JONES OFFERS

### LATHES

14x10' American Grd. Hd., M. D.	20" Kelley, Motor Dr., Gear Box.
16x8' Monarch Geared Hd., M. D.	16 & 24" G. & E. Cone Drive.
18x10' Boye & Emmes Cone Dr.	36x12" Gray Planer, 2 Heads.
24x10' & 14' American—Cone Dr.	
20x12' Boye & Emmes Cone Dr.	
36x14' American Triple Geared.	
No. 2 Warner & S. Univ. Turret.	

### RADIALS

3" Dresses & Bickford S. P. Drive.	20" Kelley, Motor Dr., Gear Box.
4" American & Mueller S. P. Dr.	16 & 24" G. & E. Cone Drive.

### SHAPERS

No. 7-A Niagara Back Grd. Incl.	No. 7-A Niagara Back Grd. Incl.
No. 4 Rockford Back Geared Incl.	No. 4 Rockford Back Geared Incl.
No. 3, 4, 5 & 6 Toledo Inclinable.	No. 3, 4, 5 & 6 Toledo Inclinable.
Toledo Nos. 90C & 92C dbl. cyl.	Toledo Nos. 90C & 92C dbl. cyl.
Ferrucote, Double Crank, Gap.	Ferrucote, Double Crank, Gap.
Hornung Presses—all sizes.	Hornung Presses—all sizes.

### MILLERS

No. 2B B & S Plain S. P. Drive.	No. 2B B & S Plain S. P. Drive.
No. 2B Milwaukee dbl. overarm.	No. 2B Milwaukee dbl. overarm.
No. 4 LeBlond Plain, Cone Drive.	No. 4 LeBlond Plain, Cone Drive.

### MISCELLANEOUS

Boring Mill Horiz. 3" bar Lambert.	Boring Mill Horiz. 3" bar Lambert.
Shears—83" x 3/4" L. & A. 10" Cap.	Shears—83" x 3/4" L. & A. 10" Cap.
42"x7" Cleveland.	42"x7" Cleveland.
72"x14" Gauge Niagara.	72"x14" Gauge Niagara.
Nibbler—Gray 7/16" cap, 36" Thr.	Nibbler—Gray 7/16" cap, 36" Thr.
Saws—9x9 Peerless M. D.	Saws—9x9 Peerless M. D.

## THE JONES MACHINE TOOL CO., FRONT & PIKE STREETS, CINCINNATI, OHIO

## If Not In Stock We Can Locate It — Write Us

### BAND SAWS

Racine 14" ball bearing.

### GRINDERS

Gardner No. 6—26", b.b., m.d., disc.  
Landis No. 2—Universal, Cyl.

Norton 10x50 Plain, Cyl.

### LATHES

Seneca Falls 9x14" semi q. c. g.  
Pratt & Whitney 16"x7", q. c. g.

Sidney 15"x8" double back geared.

Monarch 18"x8" grd. hd., m.d., q.c.g.  
Rockford 20"x10" h.d., d.b.g., q.c.g.

### MILLERS

Kearney & T. No. 1 1/2-B vert., s.p.d.  
Kearney & T. No. 1 1/2-B No. 1-B.  
No. 2-A, plain, dbl. overarm, s.p.d.  
Brown & Sharpe, No. 3-B, s.p. d.

### SHAPERS

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Kelley 16", B.C.

Cincinnati, 20", b. g., m. d.,  
PRESSES

Toledo No. 3 and No. 4, o. b. i.  
Robinson No. 2 o. b. i.

Swaine No. 35, o. b. i.

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### TURRET LATHES

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1, 2, 3, 4 & 5 sp Allen, h. s., b. b.  
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3 spidle. Allen No. 2 M. T.; p. f.  
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No. 2 Gardner disc, 18<sup>1</sup>/<sub>2</sub>, disc pr.  
No. 24-53<sup>1</sup>/<sub>2</sub> Gardner disc, arr. m. d.  
No. 20 Head rotary surface.  
No. 25 Head, hyd. rotary surface.  
No. 2 B & S. surf. m. d. & b. d.

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14<sup>1</sup>/<sub>2</sub>x6<sup>1</sup>/<sub>2</sub> Flather, q. c. g., arr. m. d.  
14<sup>1</sup>/<sub>2</sub>x6<sup>1</sup>/<sub>2</sub> LeBlond, q. c. g., t. a.  
15<sup>1</sup>/<sub>2</sub>x6<sup>1</sup>/<sub>2</sub> C. & J. c. hd, q. c. g., new.

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20<sup>1</sup>/<sub>2</sub>x9<sup>1</sup>/<sub>2</sub> Hamilton, q. c. g.  
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24<sup>1</sup>/<sub>2</sub>x12<sup>1</sup>/<sub>2</sub> Schum., B. q. c. g., t. a.  
28<sup>1</sup>/<sub>2</sub>x11<sup>1</sup>/<sub>2</sub> Hamilton q. c. g., t. a.

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No. 2B Brown & S. plain, m. d.  
No. 2A B. & S. Univ. m. d. & s.p.d.  
No. 2 Kent-Owens, Hand.  
No. 4B Becker, vert. b. b. spidle.  
No. IM Cincinnati, vertical, a.p.d.  
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No. 2½ Rockford universal.

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No. 6 Fox "Superflex".

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Die filer, No. 5 Thiel motor dr.  
Gear Hobber, No. ½ Schu. & S.  
Keyseater, No. 0 Baker, 1<sup>1</sup>/<sub>2</sub> cap.  
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# PROCUNIER HIGH SPEED TAPPING HEADS for PRECISION TAPPING



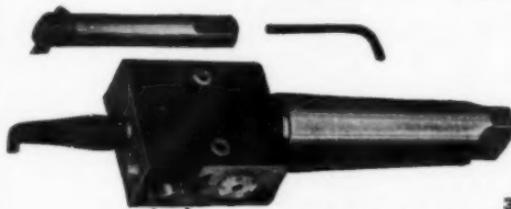
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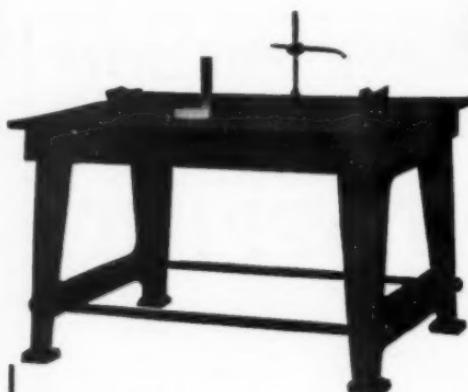
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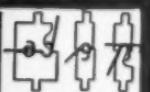
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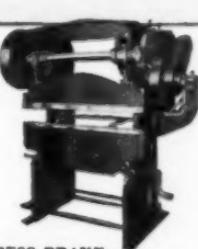
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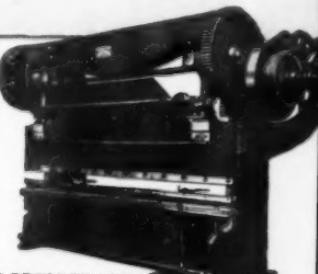
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